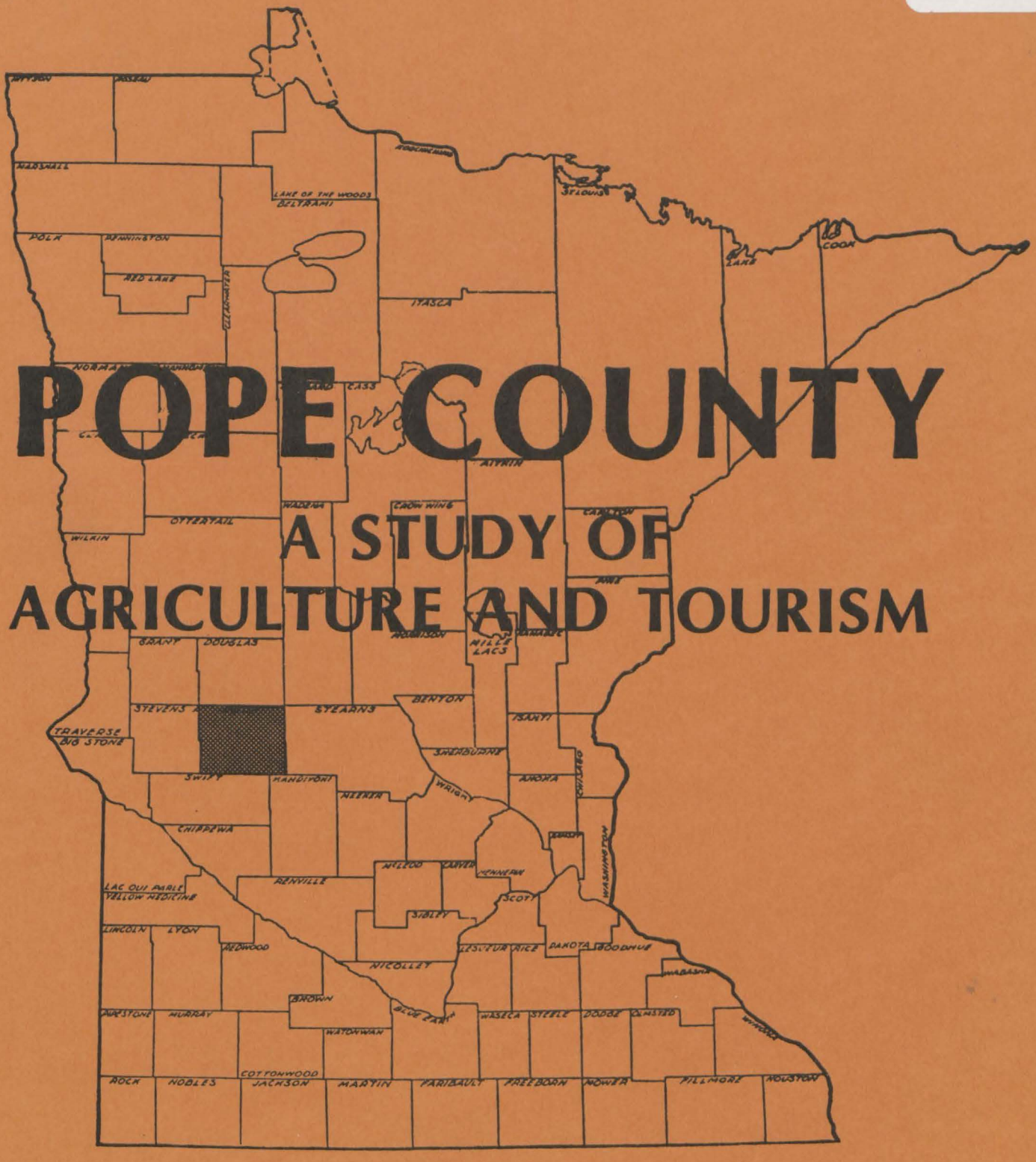

POPE COUNTY

A STUDY OF AGRICULTURE AND TOURISM

UNIVERSITY OF MINNESOTA
1988

No. 332

POPE COUNTY

A Study of Agriculture and Tourism

University of Minnesota
1988

A Report Prepared by the
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The Students of RCD Seminar
Fall 1987 - Winter 1988

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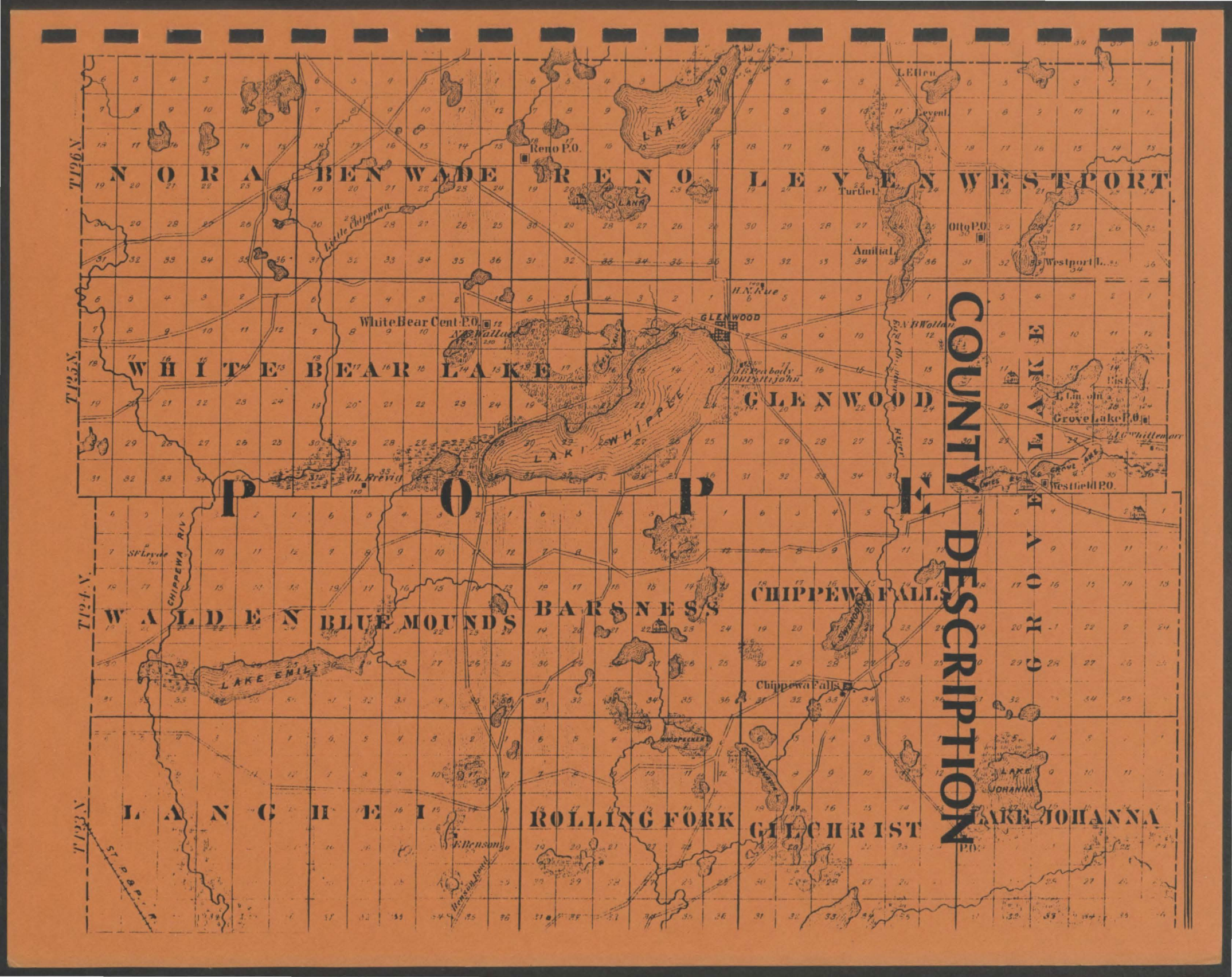
I. INTRODUCTION

The following report is an inventory and evaluation of agriculture and tourism in Pope County. The report will look at the potential for tourism growth, ways to strengthen and enhance the changing agriculture sector, and to determine how tourism and agriculture impact the natural resources of the county. As a basis for evaluation data was collected on the physical, social, and economic resources of the county. This report contains:

1. An inventory of existing tourism and agriculture practices.
2. An inventory of county agriculture and tourism resources.
3. An evaluation on possible effects of resource development on Pope County resources and the people of Pope County.
4. An inventory of existing land use regulatory infrastructure as it relates to agriculture and tourism development, as well as the availability of support for development and operation.

This report serves to help kickoff implementation of an Economic Development Program. It is intended to be used as an information base by county employees working on economic development, county commissioners, tourism-agricultural task force committee members, board members of the Community Foundation and the Economic Development Corporation, and citizens concerned with the economic well being of Pope County.

This report was prepared by students in the Resource and Community Development (RCD) Interdisciplinary Seminar at the St. Paul campus of the University of Minnesota, with guidance from faculty members in several departments. The class was organized into two basic groups, one that studied agriculture and the other that studied tourism. Each of these groups organized and provided data on specific topics. Once the data was collected, the class was reorganized for the purpose of creating this document.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NORA
BEN WADE
RENO
LEVEN
WESTPORT
WHITE BEAR LAKE
GLENWOOD
POPE COUNTY
GROVE LAKE
WALDEN
BLUE MOUNDS
BARSNESS
CHIPPEWA FALLS
LANGHEI
ROLLING FORK
GILCHRIST
LAKE JOHANNA
LAKE REND
LAKE EMILY
LAKE WHIPPEE
Reno P.O.
White Bear Cent. P.O.
Otto P.O.
Grove Lake P.O.
Westfield P.O.
Chippewa Falls
Little Chippewa
Chippewa Riv.
Lake Johanna
St. P. & P. R.R.

II. COUNTY BACKGROUND

History

The land area that is presently designated as Pope County was acquired after nearly a month of negotiations between 7,500 Sioux Indians, and Governor Alexander Ramsey and General Henry Sibley. Governor Ramsey and General Sibley had set up a camp at the Traverse des Sioux trading post on June 30, 1851. Eighteen days later, on July 18, the Sioux arrived. After five days of extensive negotiations the Traverse des Sioux Treaty was signed on July 23, 1851. All of the territory of the Sioux was transferred to the whites except for a ten mile strip on each side of the upper Mississippi River to the headwaters. The land was not open to the whites for settlement until 1854.

Pope County was named after Captain John Pope who led an expedition into the area in 1849. He had used a trail passing through Pope County called the Plains Trail. This trail was used by traders, inhabitants of the area, and other explorers such as Isaac C. Stevens, who used the trail to survey the area for the Union Pacific railroad.

John Pope was born in Louisville, Kentucky, on March 16, 1822, and died on September 23, 1892. He graduated from West Point in 1842 and served as a lieutenant in the Mexican War. After leading the expedition through Pope County in 1849, he was promoted to General in the Civil War. He eventually returned to Minnesota to be the Commander of the Department of the Northwest, with headquarters in St. Paul.

In August of 1866, a petition was formulated to organize a new county. Governor W.R. Marshall appointed Thomas Chance, J. G. Canfield, and Ole Reine as County Commissioners. Chance was elected chairman and in the fall election of 1867, Glenwood was selected as the County Seat.

Most of the early settlers in Pope County were of Swedish or Norwegian descent. Later people from Germany and England began to settle there. Each nationality tended to cluster together, founding churches which continued the home languages, customs, and beliefs. There are still some signs of the "old country" present in Pope County today.

The first permanent settler, Olaus Olson Grove, was a trapper and hunter. He settled in Pope County in 1861 and was followed, in the spring of 1862, by four of his friends. These men, who had settled in what is now Lake Johanna Township, were Ole Kittleson, Salve Oleson Gakkestad, Greger Halvorson, and John Johnson Sandvig. Their descendents are still found in the county, as well as throughout the nation.

In 1862 there was an Indian uprising which caused many of the settlers to flee to the stockades at Paynesville and St. Cloud. Most returned in 1863 or 1864 when the government declared the area safe. A band of Sioux Indians returned to steal horses in 1865, but were soon driven back west.

The first building in Glenwood was the Kinney and Lathrop store building used by Sam Johnston for a general store. In 1874 the store was purchased by Wollan Bros., who formed the "Fremad Association." The second structure in Glenwood was known as the Degroat Building on Minnesota Avenue, across from the Court House. This building burned in 1871. The third building in the county was built by George Rue and used as a store and hotel.

The first school was organized in Glenwood in 1869 with George W. Thacker as teacher. The school burned in 1873, and the next year a brick school house was built. In 1887 the Glenwood school district voted to be independent and employed J. E. Gilman as principal. In 1894 the first high school was erected.

In 1882 the Little Falls branch of the Northern Pacific Railroad came to Glenwood, followed by the Soo Line in 1886. The trains brought new growth and business to the county as well as tourists to participate in another important phase of growth for Glenwood. These people supported the resorts in the area, enjoyed recreation on the many lakes, and promoted tourism throughout the county.

The original settlers were primarily interested in farming and passed the farms on to their descendants. Pope County depends primarily on farming for its economy, but has ventured forth into several areas of manufacturing, which are responsible for a large portion of its economic resources.

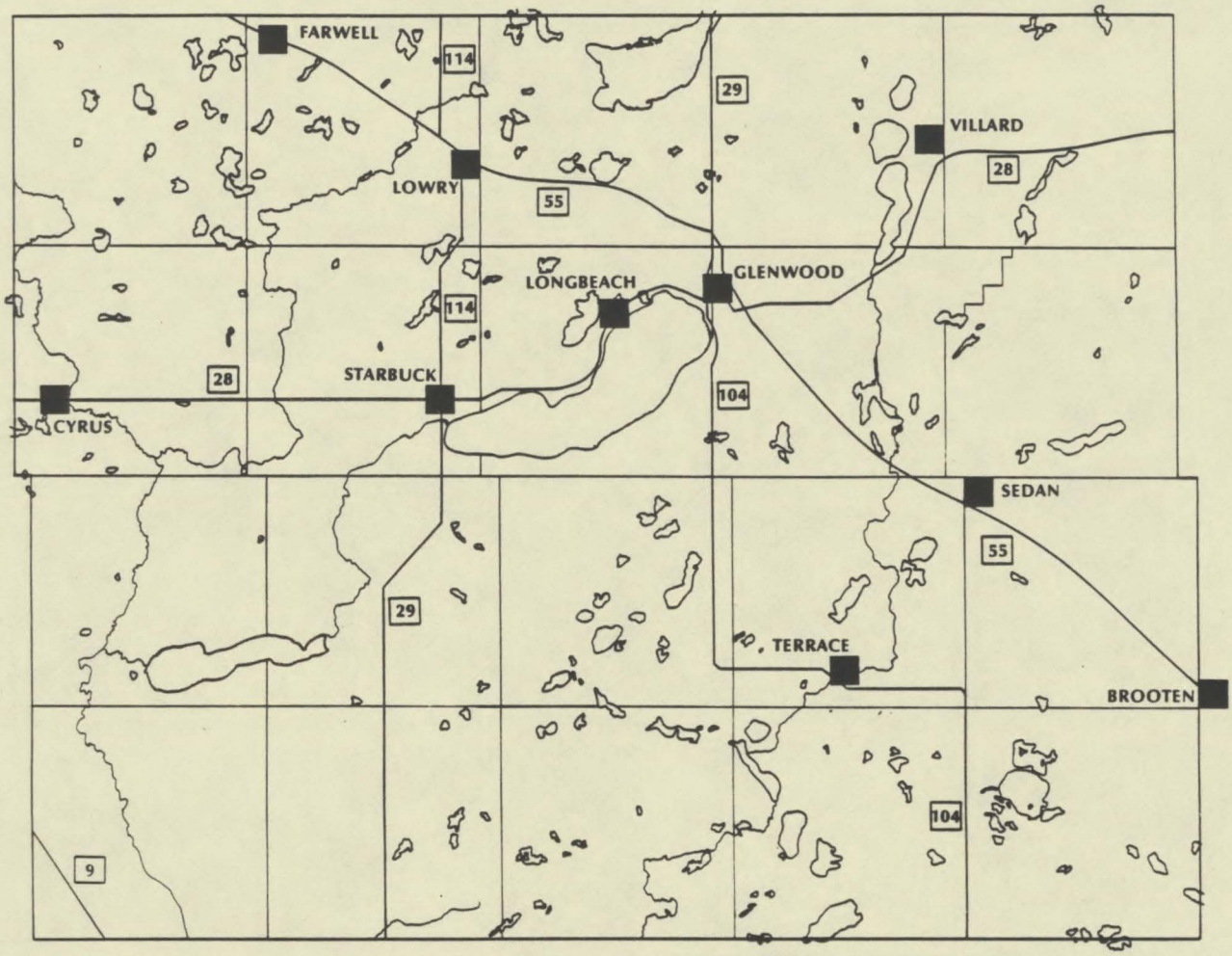
The first manufacturing venture was the Starbuck Cement Products Company. This cement tile plant opened in 1916 and employed 40 men. In 1956, eighty citizens formed the Glenwood Development Corporation, capitalizing at $40,000 for the purpose of expanding industrial activity in the area. In 1958 they built a 4,800 square foot building and sold it to Glenwood Manufacturing Corporation. They continued to actively support industry in the area. The preceding two pages are taken from Armstrong (1966) and Hughes (1930).

Geographical and Geological Description

As seen in Map 1, Pope County is rectangular in shape, 30 miles long and 24 miles wide. Its elevation ranges from 1,040 feet in Hoff Township to 1,450 feet in Leven Township. Most of the county is nearly level to gently sloping except for a broad range of hills located in the central portion of the county. These hills enter the county just west of Lake Reno and extend south and southeast across Minnewaska, Barsness, Chippewa Falls, and Gilchrist Townships and across the southwestern part of Lake Johanna Township. Except for a small area in the northeastern corner, Pope County lies within the drainage basin of the Minnesota River. Most of Pope County is drained by the Chippewa River which flows southward through the western townships.

Map 1.

HIGHWAYS AND CITIES



POPE COUNTY
MINNESOTA

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Miles

Cities

State Highways

RCD 1988
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Pope County's landscape was formed by two lobes of the Late Wisconsin Glaciation. The Alexandria Moraine complex is a prominent range of hills that bisects the north central and southeastern portions of the county. This range of hills, which begins at the eastern end of Lake Emily Valley, extends 13 miles southeast to Lake Linka, and then northeast to the village of Terrace. These hills have very steep, uniform slopes and consist primarily of water sorted sand and gravel. The soils on these hills are shallow and excessively to somewhat excessively well drained. The natural fertility is low, as well as the available water capacity. These soils are generally poorly suited for crops, but are a good source of sand and gravel for road construction.

Two large areas of stratified gravel and sand occur in Pope County. The larger area is located on the eastern edge of the Alexandria Moraine Complex and is about 8 miles wide and 40 miles long. A second smaller area of sand and gravel is located in the southwestern part of the county in Hoff and Walden Townships. The page is taken from USDA-SCS (1979).

Surface water

Lakes

There are 78 named lakes in Pope County which cover a total of 30,230 acres. The lakes are an important resource providing opportunities for swimming, fishing, boating, hunting, and aesthetic appreciation. Lakes also aid in flood control and groundwater recharge. As seen on Map 2, there are four lakes in the county that exceed 1000 acres. These are Lakes Johanna, Emily, Reno, and Minnewaska (Data Net, 1987).

Rivers and streams

Pope County is included in the Minnesota River drainage system by way of the Chippewa River and its tributaries. The drainage flow gives the county a southward flowing drainage pattern which is identified on Map 2 (Data Net, 1987).

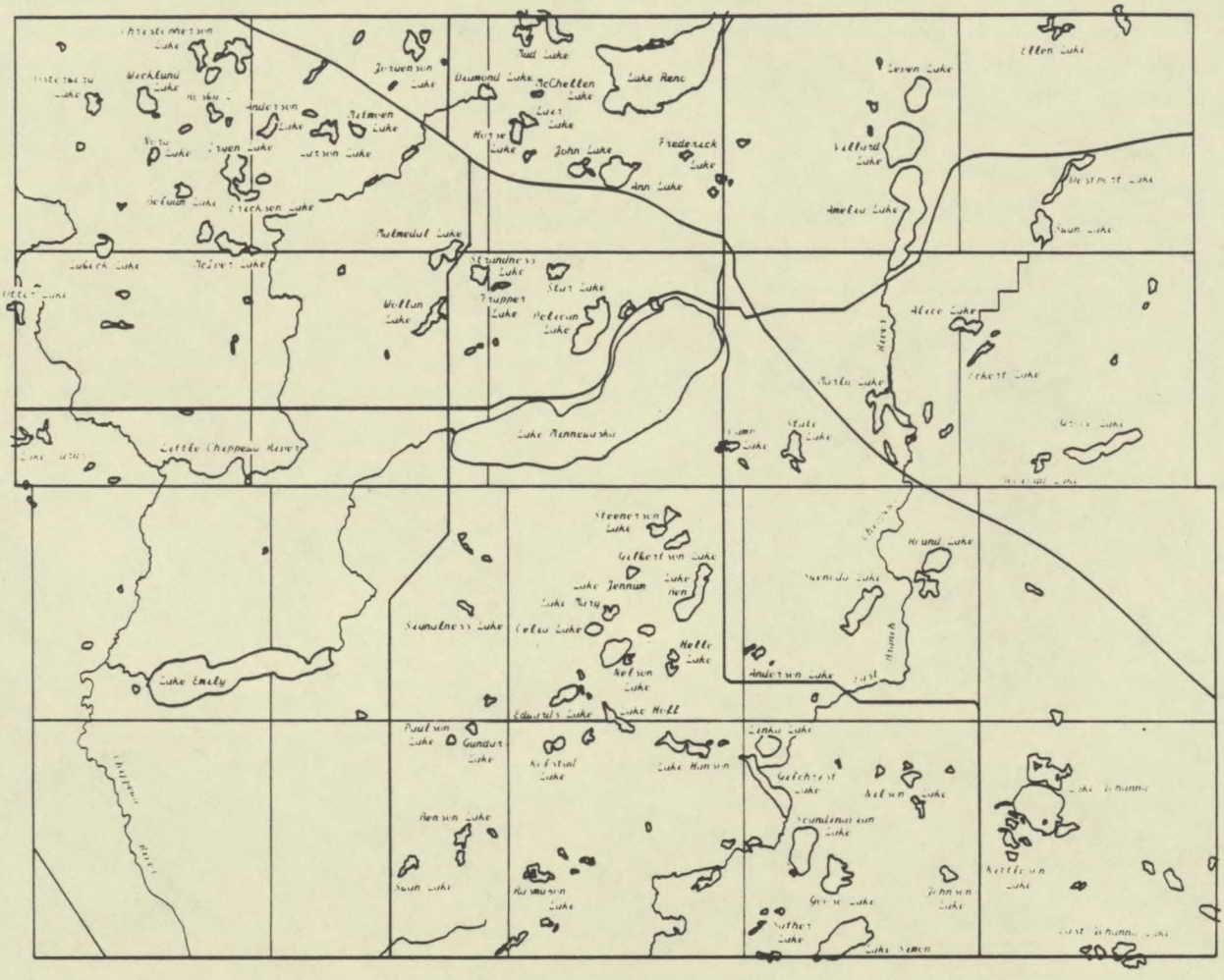
Fisheries

Public access points

Map 3 shows public access points and city owned access points to the lakes in Pope County as well as what type of access is available. Table 1 below describes the lakes that have public access and the material of which the access ramp is made.

Map 2.

WATER RESOURCES



POPE COUNTY
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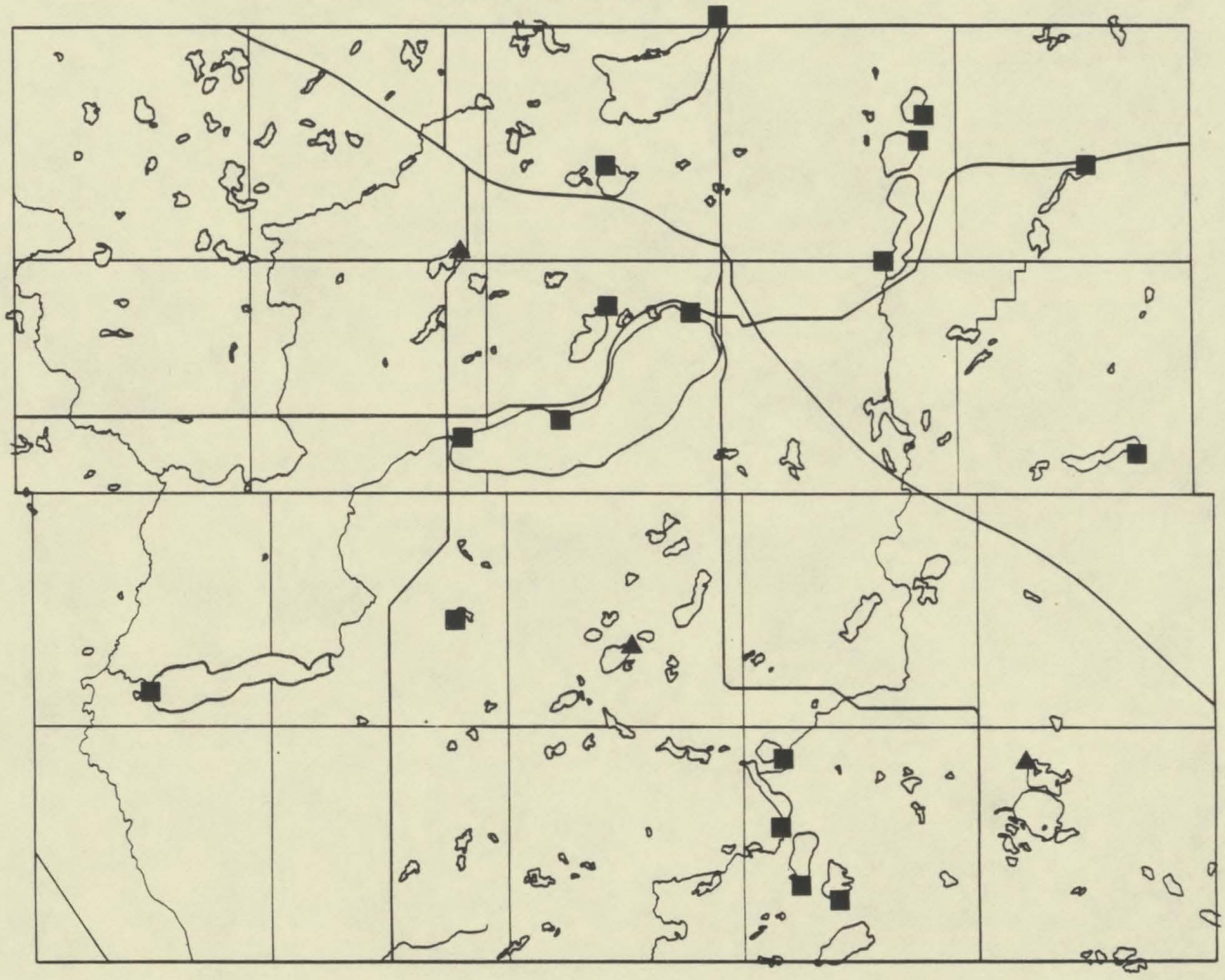
Map 3.

PUBLIC ACCESS



POPE COUNTY
MINNESOTA

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TYPE OF RAMP

Carry-In ▲

Vehicle Accessable ■

Table 1. Public Access Points

Facility Name	Lake Name	Ramp Type
(Public Owned)		
1. Amelia Lake Public Access	Amelia	Gravel
2. Ann Lake Public Access	Ann	Gravel
3. Eagle Point Public Access	Minnewaska	Concrete Slab
4. Emily Lake Public Access	Emily	Gravel
5. Gilchrist Lake Public Access	Gilchrist	Concrete Slab
6. Glacial Lakes State Park Public Access	Signalness	Gravel
7. Goose Lake Public Access	Goose	Earth
8. Grove Lake Public Access	Grove	Gravel
9. Johanna Lake Public Access	Johanna	Carry-in
10. Lake Levin Public Access	Levin	
11. Lake Reno Public Access (Douglas County)	Reno	
12. Linka Lake Public Access	Linka	Concrete Slab
13. Malmedal Lake Public Access (DOT)	Malmedal	Carry-in
14. Nelson Lake Public Access	Nelson	Carry-in
15. Pelican Lake Public Access	Pelican	Gravel
16. Scandinavian Lake Public Access	Scandinavian	Concrete Slab
17. Westport Lake Public Access (DOT)	Westport	
(City Owned)		
18. Minnewaska Public Access	Minnewaska	Earth
19. Minnewaska Public Access	Minnewaska	Concrete Slab
20. Starbuck Lakeshore Public Access	Minnewaska	Concrete Slab
21. Starbuck Marina Public Access	Minnewaska	Concrete Slab
22. Villard Public Access	Villard	Plank

Source: MnDNR Recreation Facilities Data Base. 1981.

Fish species

The diversity of the lakes, streams, and ponds in Pope County provide many different species of fish for the recreational fisherman. Northern pike, crappies, sunfish, muskellunge, perch, and large-mouth bass are just a few of the species present. Table 2 below lists the fish species found in Pope County lakes. This table first organizes the fish into the general categories of game and rough fish and then into the specific species found.

Table 2. Fish species found in Pope County

Game Fish	Species
BASS	largemouth, rock, and smallmouth
CRAPPIE	black and white
MUSKELLUNGE	
NORTHERN PIKE	
PERCH	yellow
SUNFISH	bluegill, hybrid, and pumpkinseed
WALLEYE	
Rough Fish	
BULLHEAD	black, brown, and yellow
CARP	
DOGFISH	
GOLDEN SHINER	
SHEEPSHEAD	
SUCKER	white

Source: DataNet, 1987.

Fauna and flora

The ecosystem

Pope County is fortunate in that it contains a variety of ecosystems that support many different species of plants and animals. Some of the habitats present in the county are forest, prairie, cultivated vegetation, and aquatic.

The forests in the county have trees from two types of woodlands, the "big woods" type and the "oak opening" or "oak savanna" type. The "big woods" consists of dense hardwood stands of elm, maple, aspen, and cottonwood. The "oak savanna" habitat has intermittent oaks on prairie.

The aquatic habitats in the county play a major role in the complete ecosystem of the area. The many small lakes and ponds are part of the prairie pothole region of North America and are used by waterfowl for nesting and feeding (Anderson, 1985). Due to the intensification of agriculture over the past two-hundred years loss of habitat has led to declines in the waterfowl populations.

Agriculture has changed the prairie ecosystem forever. An important factor of the prairie ecosystem is the amount of edge habitat available for wildlife use. Edge habitat is the boundary between two or more vegetation types, forming a zone of transition. This habitat is crucial to the survival of the waterfowl, pheasants, and mammals. There are many

types of edge habitat in Pope County: forest-prairie borders, prairie-agriculture borders, and forest-agriculture borders. Each can be a unique habitat supporting different wildlife and plant species. Increasing quality edge habitat has helped stabilize deer and small mammal populations and many bird species. This has been done by promoting the planting of wind breaks, encouraging conservation farming practices, and by reducing production on marginal cropland through government legislation (Anderson, 1985).

Fauna

Species that are classified as Endangered, Threatened, or of Special Concern in Minnesota are placed on lists for the following reasons: conflicts with humans, over-hunting, loss of habitat, adverse affects from pesticides, or because there is a lack of knowledge about the species. When a species is on a list because there is a lack of knowledge about it, it is usually targeted for research. The species is then studied to find out what the status of the population is in the state (Cuthbert, 1987).

Pope County has a diversity of birds and animals. Some species populations are decreasing while others are increasing. Blue-winged teal populations as well as some of the colonial waterbird species populations are decreasing in the state of Minnesota (MnDNR, MNHP, 1987). These colonial waterbird species are: cormorants, pelicans, grebes, gulls, and terns (Mn DNR, MNHP, 1987). Colonial waterbird nesting sites are places where a variety of waterbird species nest together in the summer. Of the colonial nesting sites identified in Pope County, three are multiple species nesting sites and are identified on Map 4 (MnDNR, MNHP, 1987). The Pelican Lake site has not had more than one species, the great blue heron, confirmed since 1977.

In Pope County there are several species of birds that are protected under the Migratory Bird Conservation Legislation that was passed during the years 1916 to 1929. There are many hunted species of waterfowl in the state. The mallard, wood duck, and blue-winged teal are the top three species harvested, respectively, in Minnesota (Cuthbert, 1987). In Pope County the top three species harvested are mallard, wood duck, and canvasbacks respectively. The Canada goose population, an important species for waterfowl hunting, is on the increase in the state, and in Pope County.

Pope County has two small rodents and a bird on the State Special Concern list. These are; the prairie vole (*Microtus ochrogaster*), the northern pocket gopher (*Thomomys talpoides*), and the Wilson's phalarope (*Phalaropus tricolor*). These species are on the list because there is not much biological information about them. On the States Threatened Species list is the Dakota skipper (*Hesperia dacotae*), a butterfly that is on the edge of its natural range. This butterfly depends on presettlement prairie vegetation and does not do well in disturbed fields. The Dakota skipper is more abundant in North and South Dakota,

that is why it is not on a federally protected list. The powesheik skipper (*Oarisma powsheik*) is also on the States Special Concern list and is found in Pope County (MnDNR, MNHP, 1987).

The deer population does well in the varied habitats available for it in Pope County. The agriculture base of the county provides good habitat for the deer population. There are about twelve major wintering grounds for the deer in Pope County. In recent past years, these twelve areas have had from one hundred to three hundred deer in each area. Coyotes in the area have a population that may be increasing, although this has not been documented (Larson, 1988).

Flora

There is no nationally listed endangered species of plants found in Pope County. However, the county does have plants on the State's Threatened and Special Concern lists (Cuthbert, 1987). The Minnesota Natural Heritage Program (MNHP) of the Minnesota Department of Natural Resources, has identified presettlement prairie communities that still exist in Minnesota. Three of these prairie types occur in Pope County and are listed on the State Threatened Natural Community list. These prairie communities are: the Glacial Till Hill Prairie, the Gravel Prairie, and the Blacksoil Mesic Prairie, and are identified on Map 4.

The plants on the State's Threatened Species list in the county are: sterile sedge (*Carex sterilis*), hair-like beaked-rush (*Rhynchospora capillacea*), and whorled nut-rush (*Scleria verticillata*). The plants in the county on the State Special Concern list are: hill's thistle (*Cirsium hillii*), false alphodel (*Tolieldia glutinosa*), and marsh arrow-grass (*Triglochin palustris*).

Glacial Till Hill Prairie is a natural vegetation community occurring in south central and western Minnesota. This prairie community is on deep droughty soils formed in calcareous glacial till. It occurs on the steep sided slopes along rivers, creeks, and deep drainage ditches. These soils typically have rocks and limestone fragments in the soil near the surface. Similar prairies have been located on irregular moraine deposits in northwest Iowa and eastern South Dakota. The two Glacial Till Hill Prairies in Pope County are dry mesic prairies. Both areas have been grazed in the past to varying degrees and are not in presettlement condition (MnDNR, MNHP, 1987). Names of plants in this vegetation type are listed in Table 3 below.

A Gravel Prairie is a plant community that occurs in western Minnesota. The presettlement landscape Gravel Prairies could be from one to five hundred acres large. As a result of gravel mining and intensive grazing, Gravel Prairies have been significantly reduced from their original range. Undisturbed Gravel Prairies are rare in Pope County. This soil has low fertility, very low water holding capacity and is low in organic matter. This vegetation type is located on the top of gravelly crests in morainic hills. The vegetation of Gravel Prairies is distinct from other prairie vegetation. This prairie type has a thin

Table 3. Glacial Till Hill Prairie

Species Name	Common name
Astragalus lotiflorus	Lotus milkvetch
Bouteloua gracilis	Blue grama
Bouteloua hirsuta	Hairy grama
Castilleja sessilifolia	Indian paintbrush
Coreopsis palmata	Coreopsis
Gerardia aspera	Gerardi
Linum rigidum	Stiffstem flax
Pedicularis canadensis	Woody betony
Penstremon albidus	White beardtongue
Phlox pilosa	Downy phlox
Prenanthus racemosa	White lettuce
Silphium laciniatum	Compass plant
Veronicastrum virginianum	Culvers root
Zizia apter	Goldenal exanders

Source: MN Department of Natural Resources. The Minnesota Natural Heritage Program. Information from the data base network. 1987.

soil and has exposed gravel and stones on the surface. The lichens associated with the rock surfaces, and the dense layer of forbs are common Gravel Prairie vegetation. The xeric or dry prairie supports mid- and short-grasses. The short grasses get clumped together, forming an open bunch structure that is more characteristic of prairies to the west (MnDNR, MNHP, 1987). Plants that are common in this vegetation type are listed in Table 4 below.

Table 4. Gravel Prairie Plants

Species name	Common name
Aristada longiseta	Red three awn
Artemesia frigida	White sage
Astagalus adsurgens	Ground plum
Bouteloua gracilis	Blue grama
Bouteloua hirsuta	Hairy grama
Calamouilfa longfolia	Sand reedgrass
Carex filifolia	Threadleaf sedge
Cerastium arvense	Plains chickweed
Chrysopis villosa	Silky aster

Source: MN Department of Natural Resources. The Minnesota Natural Heritage Program. Information from the data base network. 1987.

The Mesic Blacksoil Prairie community has been converted into cropland. This soil is very productive as agriculture lands. There is a need to establish large areas of this native prairie because it is important for ecosystem processes that perpetuate the species of plants and animals that live in Mesic Blacksoil Prairies. Intact tracts of Mesic Blacksoil Prairie are of national importance because of the very small proportion that is in presettlement condition in the country (MnDNR, MNHP, 1987). Plants of this vegetation type are in Table 5 below.

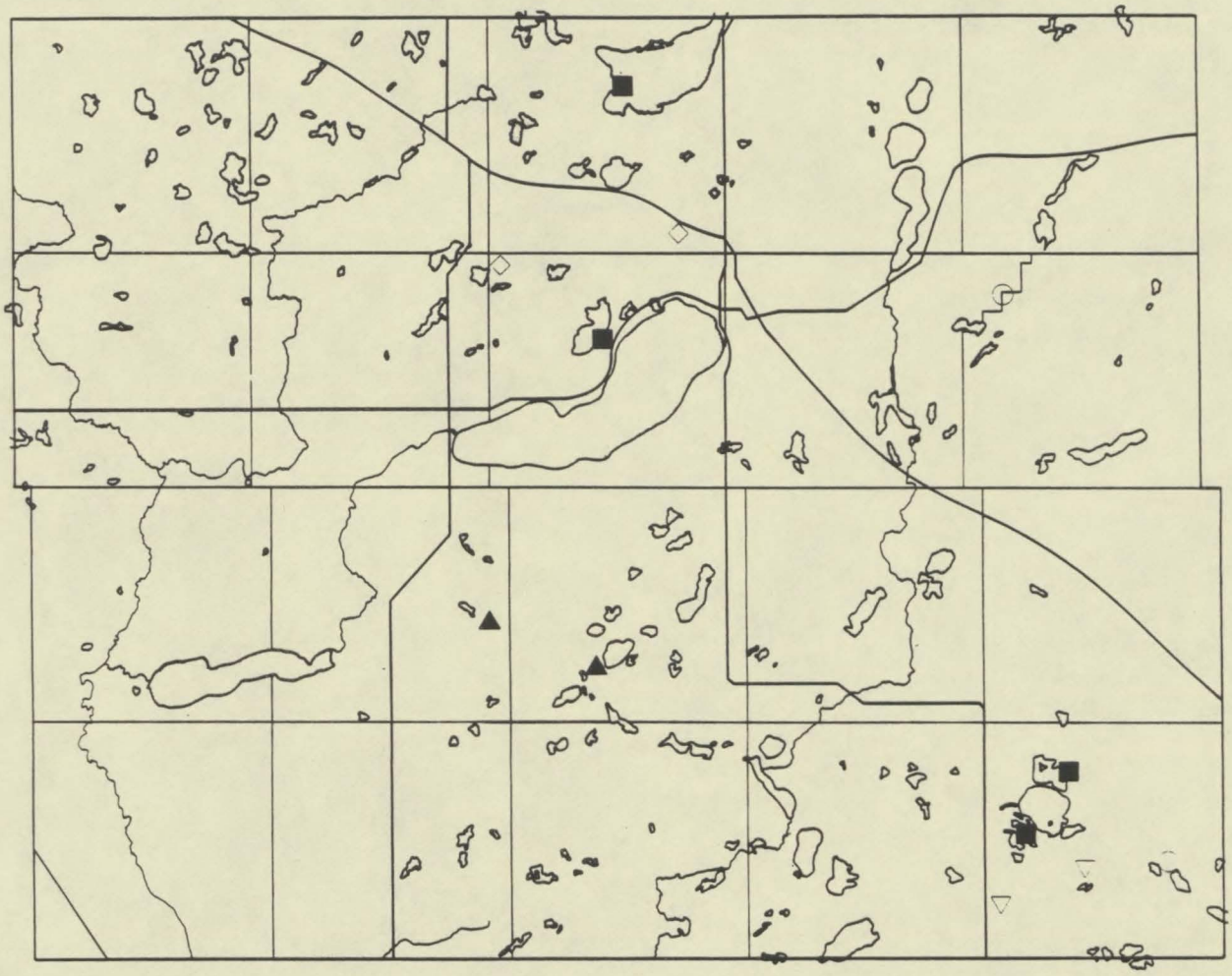
Table 5. Mesic Blacksoil Prairie Plants

Species name	Common name
Agropyron trachycaulum	Slender wheatgrass
Allium stellatum	Prairie onion
Amorpha nana	Fragrant false indigo
Andropogon gerardi	Big bluestem
Aposeris glauca	Prairie dandelion
Ascelepias ovalifolia	Milkweed
Aster laevis	Smooth aster
Calamagrotis inexpansa	Northern reedgrass
Cirsium floodmanii	Prairie thistle
Cypripedium candidum	White ladyslipper
Glycryrrhiza lepidota	American licorice
Helianthus maximiliana	Sunflower
Liatris ligulistylis	Blazing star
Lilium philadelphicum	Prairie lily
Muhlenbergia richardsonis	Richardson's muhly
Poa palustris	Fowl-meadow grass
Psoralea agrophylla	Silver scurf-pea
Pycnanthemum virginianum	Mountain-mint
Schizachrium scoparium	Little bluestem
Sorghastrum nutans	Indian grass
Spartina pectinata	Cordgrass
Sporobolus heterolepis	Northern dropseed
Stipa spartea	Needlegrass
Stipa viridula	Green needlegrass
Zizia aptera	Golden Alexanders
Zygadenus elegans	Death camas

Source: MN Department of Natural Resources. The Minnesota Natural Heritage Program. Information from the data base network (1987) and an interview with Jerry Larson on January 28, 1988.

Map 4.

ORIGINAL PLANT AND ANIMAL COMMUNITIES



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ECOSYSTEM TYPES

- Glacial Till Hill Prairies
- Gravel Prairie
- Mesic Black Soil Prairie
- Conifer Swamps
- Colonial Waterbird Nesting Sites

Another unique vegetation type identified by the MNHP is the plant community found in the conifer swamps in the state (Mn DNR, MNHP, 1987). This plant community does not have a legal status like the prairie communities mentioned earlier. As a natural community its status is undetermined and will be studied in the future. The conifer swamps in Pope County are on the western edge of a line of swamps that are more abundant in Stearns and Kandiyohi Counties. This line of swamps through the central part of Minnesota was formed on a glacial moraine.

Demographics

Population

Pope County's population is increasing slightly. Compared to the surrounding counties, the increase is small. From 1970 to 1980 there was a five percent increase in the population in Pope County. The 1986 population estimate predicted the addition of 41 people to the county from 1980 to 1986 (Datanet, 1980).

Table 6. Population

County	Total Population		Land Area	Density	70-80	1986
	1970	1980	(Sq Mi)	(Per Sq Mi)	Change	Estimates
Douglas	22910	27839	647	43.0	21.5%	29953
Grant	7462	7171	546	13.1	-3.9%	7055
Kandiyohi	30548	36763	783	47.0	20.3%	39879
Pope	11107	11657	669	17.4	5.0%	11698
Stearns	95400	108161	1342	80.6	13.4%	115786
Stevens	11218	11322	558	20.3	0.9%	11128
Swift	13177	12920	739	17.5	-2.0%	12445
Todd	22114	24991	942	26.5	13.0%	25456

Source: Datanet, 1980.
Estimates from the Minnesota Office of the State Demographer.

This increase in population appears to be primarily in the rural nonfarm sector. Rural nonfarm populations are defined as persons living in communities of less than 2500 persons in open countryside and not on commodity producing farms. Rural farm populations are defined as persons living in rural territory on places from which $1,000 or more of farm-derived commodities were sold. Urban populations are defined as communities of 2,500 or more persons (U.S. Bureau of Census, 1980). From Figure 1 it is evident that since 1940 the rural farm population has steadily declined from being the largest population source. In the same time period, the rural nonfarm population has continued to grow while the urban population has remained fairly stable.

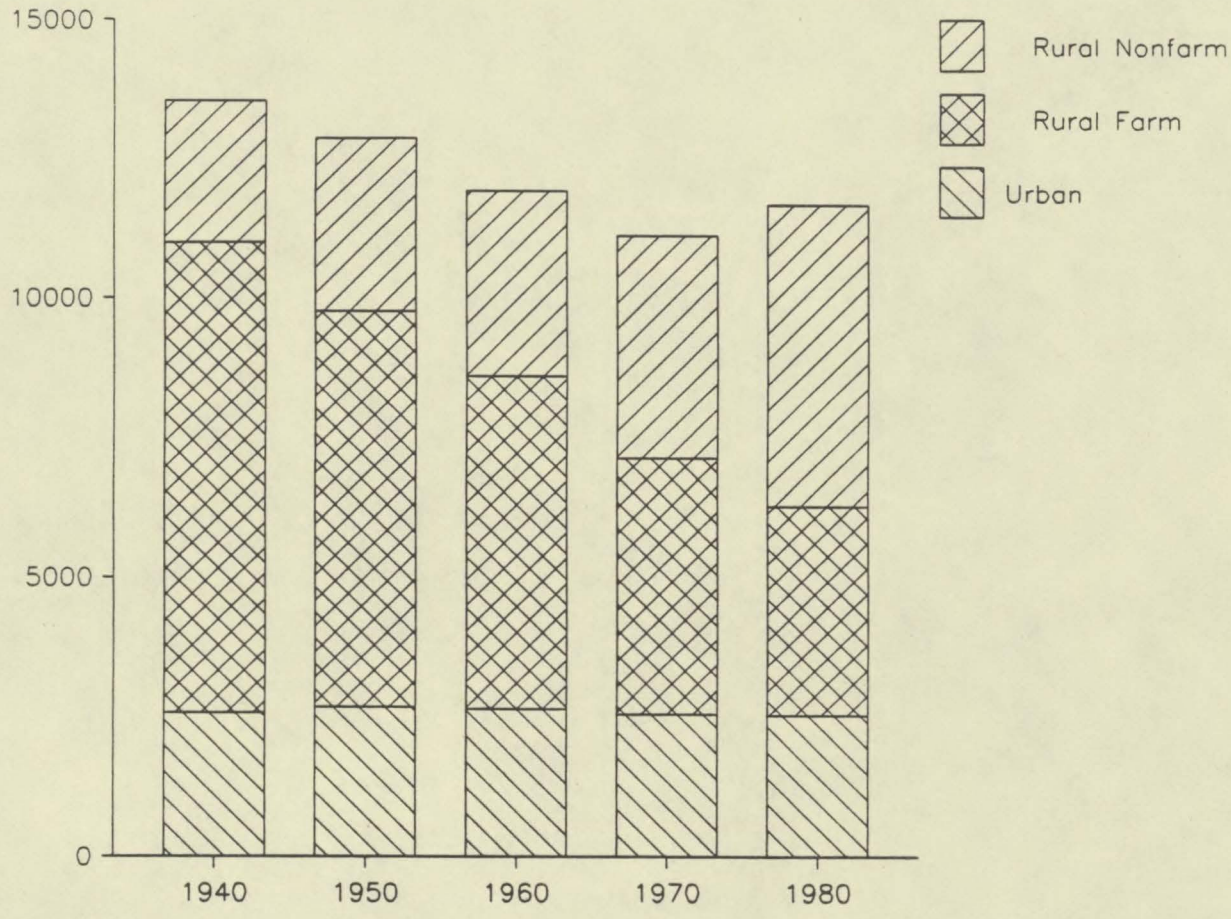


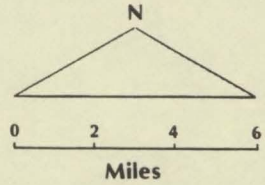
Figure 1. Population Changes in Pope County
Source: Figure prepared by Gordon D. Rose, Dept. of Ag & Applied Econ., U of MN, 1985.

To determine where the population is changing within Pope County, one must examine the population change by township/city. Minnewaska and Glenwood Townships have increased in population by at least 36%. Chippewa Falls Township and the cities of Long Beach, Starbuck, and Villard have increased by at least 5%. The townships adjacent to Minnewaska and Glenwood have declined slightly or remained stable. Substantial decreases in population have occurred in Westport City (-43%), Sedan City (-32%), Rolling Forks Township (-31%), Barsness Township (-31%), Farwell City (-27%), Ben Wade Township (-26%), Hoff Township (-23%), Gilchrist Township (-22%), and Langhei Township (-22%). Most of these decreases occur in townships that are on the southern edge of Pope County. See Table 7 and Map 5.

Map 5.

POPULATION CHANGE FROM 1960 TO 1980

POPE COUNTY
MINNESOTA



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PERCENT CHANGE

21 – 35	decrease	
5 – 20	decrease	
less than 5		
7	increase	
48	increase	
134	increase	

Source: U.S. Bureau of Census, 1980.
Economic Development Study of Starbuck, MN 1986.

Table 7. Population Change by Township/City

Township/City	1960	1970	1980	60-80 Change	1986 Est.
Bangor Township	290	239	234	-19%	254
Barsness Township	271	213	187	-31%	203
Ben Wade Township	415	314	306	-26%	298
Blue Mounds Township	333	247	284	-15%	226
Chippewa Falls Township	318	312	341	7%	348
Cyrus City	362	289	334	-8%	326
Farwell City	106	102	77	-27%	69
Gilchrist Township	280	219	218	-22%	242
Glenwood City	2631	2584	2523	-4%	2432
Glenwood Township	557	732	827	48%	863
Grove Lake Township	315	268	314	0%	342
Hoff Township	314	255	241	-23%	223
Lake Johanna Township	197	161	189	-4%	200
Langhei Township	347	312	270	-22%	259
Leven Township	468	460	488	4%	547
Long Beach City	236	219	263	11%	269
Lowry City	294	257	283	-4%	283
Minnewaska Township	209	227	490	134%	507
New Prairie Township	326	293	263	-19%	237
Nora Township	369	309	306	-17%	319
Reno Township	394	331	364	-8%	394
Rolling Forks Township	300	246	207	-31%	162
Sedan City	91	55	62	-32%	65
Starbuck City	1099	1138	1224	11%	1174
Villard City	235	221	275	17%	259
Walden Township	283	251	261	-8%	267
Westport City	87	65	50	-43%	50
Westport Township	329	337	300	-9%	338
White Bear Lk Township	458	451	476	4%	542
County Total	11914	11107	11657	-2%	11698

Source: U.S. Bureau of Census, 1980.
Economic Development Study of Starbuck, MN 1986.

The largest age group of Pope County residents are those age 15 to 19 years old. The next highest age categories are the 10 to 14 and the 4 and under age classes. Adjacent counties also have high percentages of 15 to 19 year olds. See Table 8. Pope County has a greater percentage of older persons than most surrounding counties, except for Grant County (Datanet, 1980).

The median age in Pope County is 35.1 years (Economic Development Study of Starbuck, MN, 1986). Within the townships and cities of Pope County, as shown on Map 6 and Table 9, the median age varies from 24.4 in Bangor Township to 55.2 in the city of Starbuck.

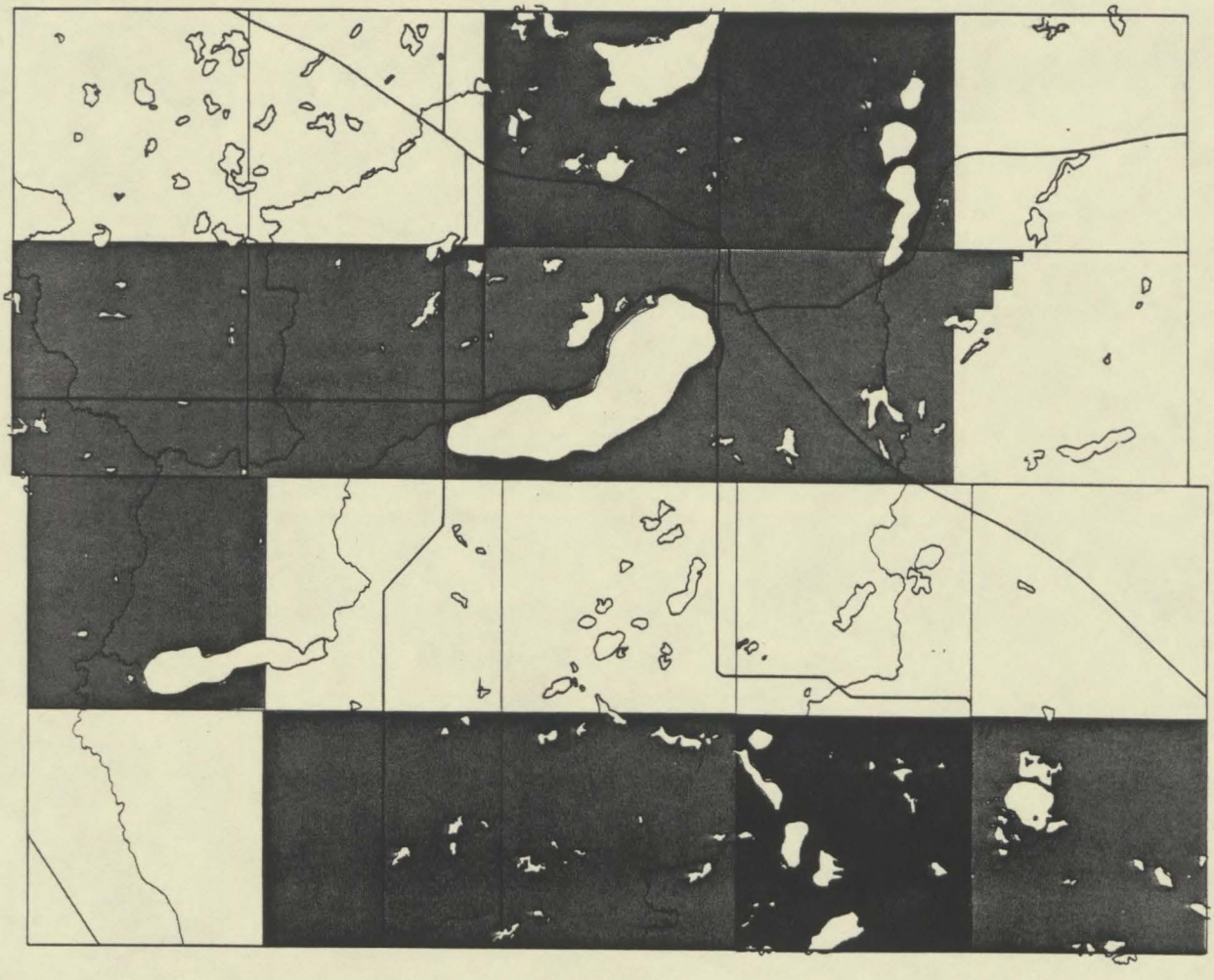
Table 8. Percent of Total Persons in Age Classes

Age	Pope	Douglas	Grant	Kandiyohi	Stearns	Stevens	Swift	Todd	MNMetro	MNState	Nation
0-4	7.8	7.8	7.1	8.0	8.2	7.6	8.0	8.8	7.0	7.5	7.2
5-9	6.9	7.0	6.7	7.3	7.4	6.3	6.9	8.1	6.9	7.2	7.4
10-14	7.8	7.9	7.4	7.5	8.8	7.6	8.9	8.9	8.1	8.2	8.1
15-19	8.5	10.3	8.6	10.2	13.5	12.1	9.1	10.2	9.4	9.8	9.3
20-24	6.5	8.5	5.9	9.6	13.4	12.5	7.1	6.6	10.2	9.6	9.4
25-29	6.5	7.2	6.7	8.4	7.9	7.1	6.6	7.0	9.9	8.9	8.6
30-34	5.9	6.2	5.3	6.8	6.4	5.7	5.8	5.8	8.8	7.7	7.8
35-39	4.8	5.6	4.8	5.3	4.8	4.6	4.8	5.3	6.7	6.1	6.2
40-44	4.5	4.5	4.8	4.6	4.2	3.7	4.3	4.6	5.3	5.0	5.2
45-49	4.6	4.3	4.4	4.3	4.2	4.5	4.3	4.5	4.7	4.6	4.9
50-54	5.4	4.6	5.4	4.8	4.1	4.9	5.1	4.5	4.8	4.8	5.2
55-59	5.9	5.0	5.5	4.7	3.8	4.6	5.9	5.1	4.6	4.6	5.1
60-64	6.0	5.2	6.1	4.9	3.5	4.6	5.8	5.1	3.7	4.2	4.5
65-69	5.7	4.9	6.3	4.2	3.2	4.3	5.0	4.8	3.1	3.6	3.9
70-74	4.6	3.9	5.3	3.5	2.5	3.3	4.7	4.0	2.4	3.0	3.0
75-79	3.6	3.1	4.5	2.6	1.9	2.8	3.5	3.2	1.9	2.3	2.1
80-84	2.8	2.2	2.9	1.9	1.3	1.9	2.4	2.0	1.3	1.6	1.3
85+	2.2	1.9	2.6	1.6	0.9	1.7	1.9	1.5	1.1	1.3	1.0

Source: Datanet, 1980.
U.S. Bureau of Census, 1980.

Map 6.

MEDIAN AGE OF POPULATION; BY TOWNSHIP



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MEDIAN AGE

21 – 30
31 – 40
41 – 50

Source: U.S. Bureau of Census, 1980.
Economic Development Study of Starbuck, MN 1986.

Table 9. Median Age and Housing in Pope County

Township/City	1980 Median Age	Total Housing Units	Percent Seasonal Units
Bangor Township	24.4	81	
Barsness Township	28.4	66	2%
Ben Wade Township	29.0	102	
Blue Mounds Township	29.4	90	
Chippewa Falls Township	25.5	112	
Cyrus City	38.0	156	
Farwell City	52.2	34	6%
Gilchrist Township	41.7	234	60%
Glenwood City	44.6	1097	
Glenwood Township	31.0	418	28%
Grove Lake Township	28.0	150	29%
Hoff Township	26.3	89	
Lake Johanna Township	31.8	92	12%
Langhei Township	33.4	102	
Leven Township	35.3	373	54%
Long Beach City	43.5	224	46%
Lowry City	38.3	112	
Minnewaska Township	33.5	495	63%
New Prairie Township	34.4	92	
Nora Township	27.3	95	
Reno Township	31.0	142	11%
Rolling Forks Township	32.8	70	
Sedan City	40.7	34	6%
Starbuck City	55.2	611	
Villard City	31.9	113	4%
Walden Township	31.9	91	1%
Westport City	28.0	26	23%
Westport Township	25.0	92	3%
White Bear Lk Township	35.0	265	26%
Pope County	35.1	5658	18%

Source: U.S. Bureau of Census, 1980.
Economic Development Study of Starbuck, MN 1986.

Housing

The mean number of persons per occupied housing unit is 2.69. This is similar to the surrounding counties. Housing is classified as occupied if it is the usual place of residence of the person or group (U.S. Bureau of Census, 1980).

As seen on Map 7, the percent of seasonal housing in Pope County is greatest in Minnewaska Township (63%). Seasonal housing units are units that are intended for occupancy only certain seasons of the year, such as

housing for recreational or hunting use (U.S. Bureau of Census, 1980). Gilchrist (60%), Leven (54%), and Long Beach City (46%) also have high percentages of seasonal housing units. This is due to the seasonal lake homes in these areas.

The total number of year-round housing units in Pope County is 4,627 units. Of these, 4,241 are occupied and 386 are vacant. The number and type of housing available in Pope County as compared to surrounding counties is presented in Table 5. There appears to be a large number of vacant seasonal or migratory housing units in Pope County as compared to the total number of housing units. Migratory housing units are vacant units held for occupancy by migratory labor employed in farm work during the crop season (U.S. Bureau of Census, 1980).

Table 10. Total Number and Type of Housing by County

	Pope	Douglas	Grant	Kandiyohi	Stearns	Stevens	Swift	Todd
Total Units	5658	13179	3192	15100	35961	4222	5182	10691
Vac Seasonal/Migratory	1031	2456	248	1405	2291	30	54	1273
Year-round Units	4627	10723	2944	13695	33670	4192	5128	9418

Source: U.S. Bureau of Census, 1980.

The availability of year-round housing in Pope County by vacancy status is shown in Table 11. There does not appear to be a shortage of year-round housing in Pope County. There are more year-round housing units for rent than for sale. The percent vacancy rate is also higher for rental units than for sale units. Table 12 presents the duration of vacancy of housing units in Pope County. More vacancies are for rent than for sale. Units for sale tend to be vacant longer than units for rent.

Table 11. Vacant Year-round Housing Units by Vacancy Status

Vacancy Status	Number/Percent
Vacant housing units	386
For sale only	54
Homeowner vacancy rate	1.6%
Complete plumbing for exclusive use	49
For rent	72
Rental vacancy rate	7.6%
Complete plumbing for exclusive use	67
Rented or sold, awaiting occupancy	62
Held for occasional use	46
Other vacant	152
Boarded up	4

Source: U.S. Bureau of Census, 1980.

Table 12. Duration of Vacancy of Housing Units

	Vacant For Sale	Vacant For Rent
Total	54	72
Less than 2 months	2	25
2 to 6 months	14	33
6 or more months	38	14

Source: U.S. Bureau of Census, 1980.

The median value of owner occupied year-round housing units in Pope County is $34,200. Year-round housing units are all occupied or vacant units available or intended for year-round use. For the state of Minnesota, the median value of owner occupied year-round housing units is $53,100. In the urban sector of the state of Minnesota, the median value is $56,500. While in the rural sector of the state of Minnesota, the median value is $41,000 for owner occupied year-round housing units. Pope County's year-round median housing value is actually less than the median value of housing in the rural sector of Minnesota (U.S. Bureau of Census, 1980).

Ancestry

Most of Pope County's residents are of multiple ancestry. The largest pure ethnic group is Norwegian (2808), followed by German (1608) and then Swedish (352) (U.S. Bureau of Census, 1980).

Table 13. Pope County Persons by Ancestry

Dutch	140	Norwegian	2808	Multiple Ancestry	4481
English	170	Polish	74	Ancestry not specified:	
French	49	Portuguese	0	Other	387
German	1608	Russian	6	Not reported	791
Greek	0	Scottish	34		
Hungarian	0	Swedish	352		
Irish	144	Ukranian	4		
Italian	6				

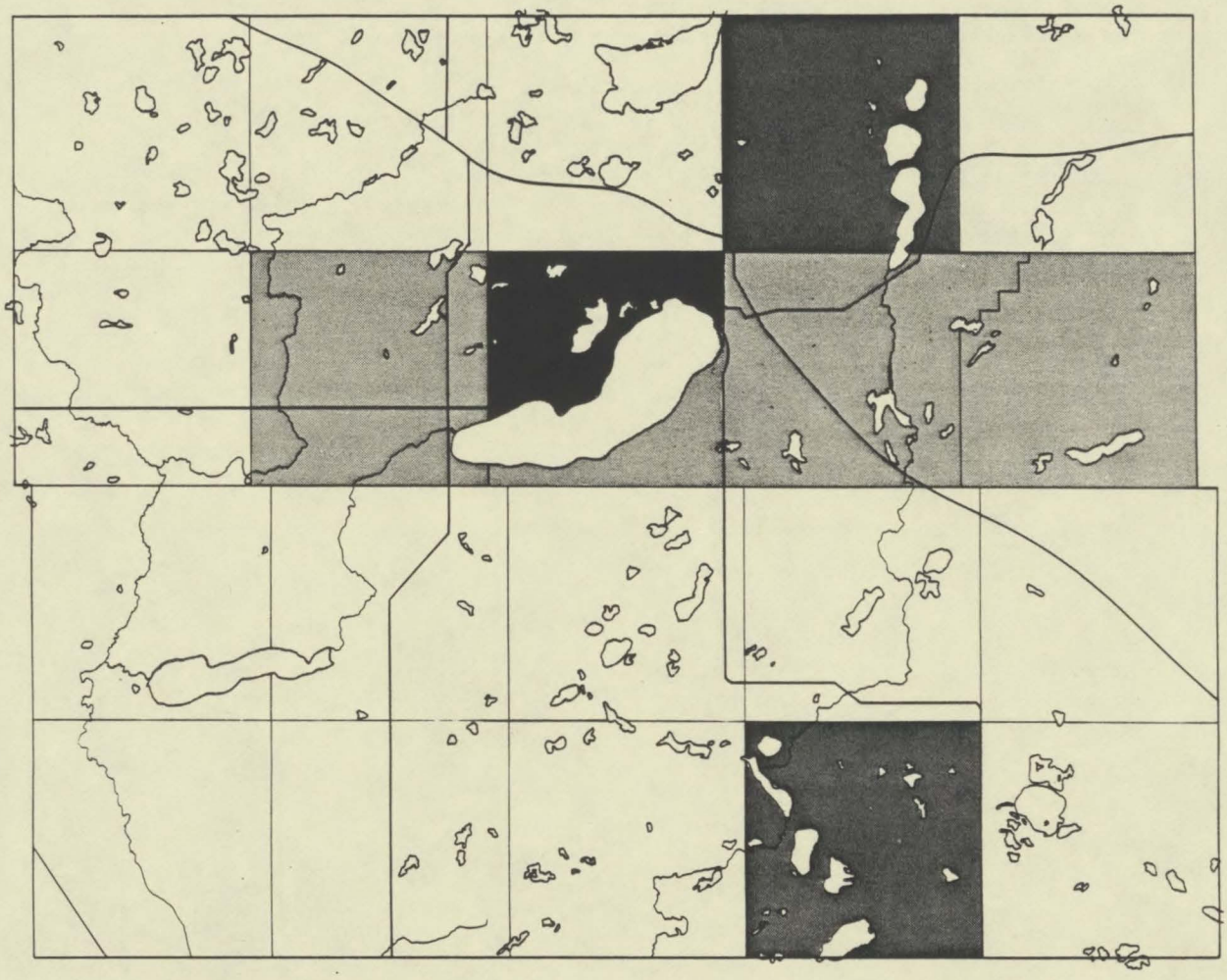
Source: U.S. Bureau of Census, 1980.

Education

Education is important to Pope County in terms of the opportunities available and as an indicator of the current education level of the residents. Map 8 shows the eight school districts in Pope County. Table 14 presents the four school districts under Pope County jurisdiction and the 1987-88 enrollment. Pope County does not contain any post secondary

Map 7.

PERCENT SEASONAL HOUSING UNITS BY TOWNSHIP



POPE COUNTY
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Miles

PERCENT

- Data not available
- less than 15
- 15 – 30
- 31 – 60
- greater than 60

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Source: U.S. Bureau of Census, 1980.
Economic Development Study of Starbuck, Mn 1986.

schools, however there are several in the surrounding counties as indicated in Table 15.

Table 14. School Districts in Pope County

SCHOOL DISTRICT	NAME	GRADES	1987-88 ENROLLMENT
Cyrus School District 611			
Box 39	Cyrus Elem.	K-6	96
Cyrus, MN 56323	Cyrus Sec.	7-12	87
(612) 795-2216			
Glenwood School District 612			
N.E. 2nd Ave.	Nordgaard Elem.	K-4	421
Glenwood, MN 56334	Central Elem.	5-6	147
(612) 634-4241	Glenwood Sec.	7-12	457
Starbuck School District 614			
500 John St.	Starbuck Elem.	K-6	229
Starbuck, MN 56381	Starbuck Sec.	7-12	204
(612) 239-2256			
Villard School District 615			
Box 66	Villard Elem.	K-6	131
Villard, MN 56385	Villard Sec.	7-12	103
(612) 554-2201			

Source: Minnesota Education Directory 1987-1988, Dept. of Educ.

Table 15. Post Secondary Schools near Pope County

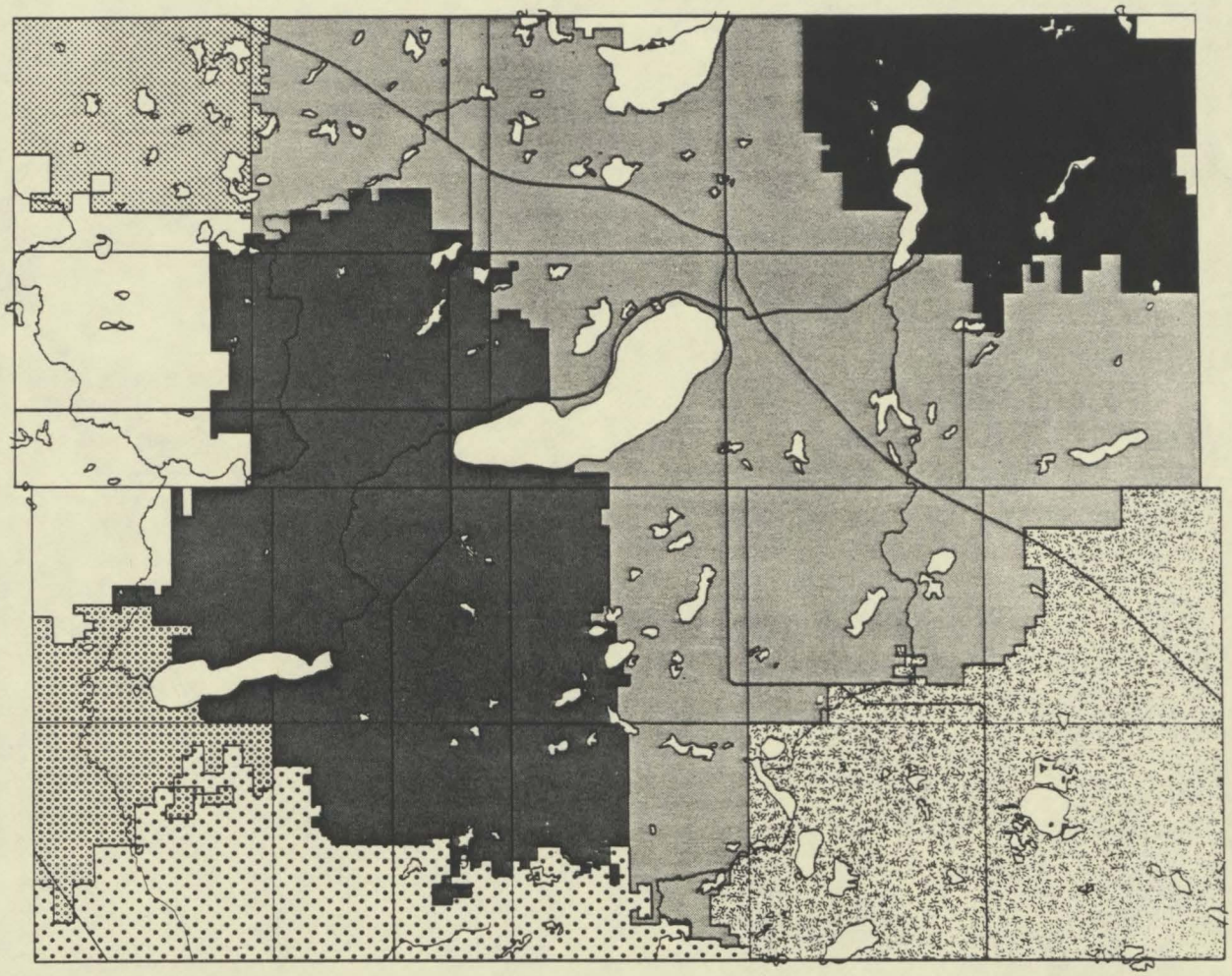
Alexandria Vo-Tech - Alexandria, MN
Fergus Falls Community College - Fergus Falls, MN
St. Cloud State University - St. Cloud, MN
St. Cloud Vo-Tech - St. Cloud, MN
Wadena Vo-Tech - Wadena, MN
Willmar Community College - Willmar, MN
Willmar Vo-Tech - Willmar, MN
University of Minnesota - Morris, MN

Source: Economic Development Study of Starbuck, MN 1986.

A relatively large number of persons (29%) 25 plus years of age have only an elementary education level. This fact can be explained by the presence of a large older population. In the past it was common to obtain only an elementary education.

Map 8.

SCHOOL DISTRICTS



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611 – Cyrus
612 – Glenwood
614 – Starbuck
615 – Villard
737 – Brooten
768 – Hancock
777 – Benson
209 –

Table 16. Years of School Completed for Persons 25+ Years of Age

Years of School	Pope County	Minnesota
Elementary		
0 to 8 years	29%	17%
High School		
1 to 3 years	10%	10%
4 years	38%	39%
College		
1 to 3 years	14%	17%
4 or more years	9%	17%
Total persons 25+	7290	2345701

Source: U.S. Bureau of Census, 1980.

Health care

According to health care facility administrators, Pope County has a variety of health care facilities including two hospitals, two clinics, three nursing homes, and the Pope County Public Health Service. Outpatient services are available for terminally ill, disabled, and geriatric patients.

Hospitals

Glacial Ridge Hospital, Glenwood, MN
34 bed capacity

Minnewaska District Hospital, Starbuck, MN
19 bed capacity

Clinics

Glenwood Medical Center, Glenwood, MN
3 physicians

Starbuck Clinic, Starbuck, MN
2 physicians

Nursing Homes

Glenwood Retirement Home, Glenwood, MN
Skilled Care, Intermediate Care Facility, Board & Care
100 bed capacity, 97% occupancy

Lakeview Care Center, Glenwood, MN
Skilled Care, Intermediate Care Facility
69 bed capacity, 94% occupancy

Minnewaska Lutheran Home, Starbuck, MN
Intermediate Care Facility, Board & Care
76 bed capacity, 98% occupancy

Services

Pope County Public Health Service
Pope County Courthouse, Glenwood, MN

Income

The largest percentage of personal income in Pope County is from dividends, interest, and rent. This is income from investments or assets owned. The second largest source of personal income is nonfarm-private. The third largest source of personal income is in the form of transfer payments. Transfer payments are income payments to persons generally in monetary form, for which they do not render current services. (U.S. Bureau of Economic Analysis, 1986A). Transfer payments are passive sources of income to the county. Dividends, interest, and rent and transfer payments as sources of personal income have increased since 1959, and represent a significant source of capital. Meanwhile, the percent of personal income from farming has decreased unsteadily since 1959. This is a reflection of the farm crisis in rural Minnesota. See Table 17.

In Table 17 there are categories of sources of personal income entitled "residence adjustment" and nonfarm-government. "Residence adjustment" is defined as payments to people who reside in Pope County but work outside of the county. This personal income source has increased since 1959. This means that more people are working outside of the county. The nonfarm-government category is income from government jobs. It has remained fairly stable. Figures 2 and 3 depict the amount and changes of personal income sources in Pope County.

Table 17. Percent of Personal Income by Major Sources

	1959	1962	1975	1976	1977	1978	1979	1980	1981	1982	1983
Farm	25.5	26.1	22.5	7.5	24.2	16.9	14.9	10.4	13.3	7.4	4.9
Nonfarm-private	37.3	32.9	31.4	36.5	29.2	32.6	33.8	32.3	28.1	28.4	29.0
Nonfarm-government	10.9	11.7	8.7	10.0	7.8	8.4	8.1	8.5	7.9	8.4	9.2
Div., int.,& rent	13.2	15.1	16.8	20.8	18.3	19.9	21.2	24.6	27.0	29.3	29.3
Transfer payments	12.0	12.0	15.1	18.2	14.6	15.4	15.4	17.5	17.2	19.3	20.0
Residence adjust.	1.1	2.1	5.5	7.0	5.9	6.7	6.7	6.7	6.6	7.2	7.6
Subtotal	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Personal cont. to soc. ins.	-1.8	-1.8	-2.7	-3.1	-2.4	-2.5	-2.6	-2.7	-2.5	-2.7	-2.8
Total	98.2	98.2	97.3	96.9	97.6	97.5	97.4	97.3	97.5	97.3	97.2

Source: Major sources of Personal Income, Bureau of Economic Analysis, 1985.
Table prepared by Gordon D. Rose, Dept. of Ag & Applied Econ., U of MN, 1985

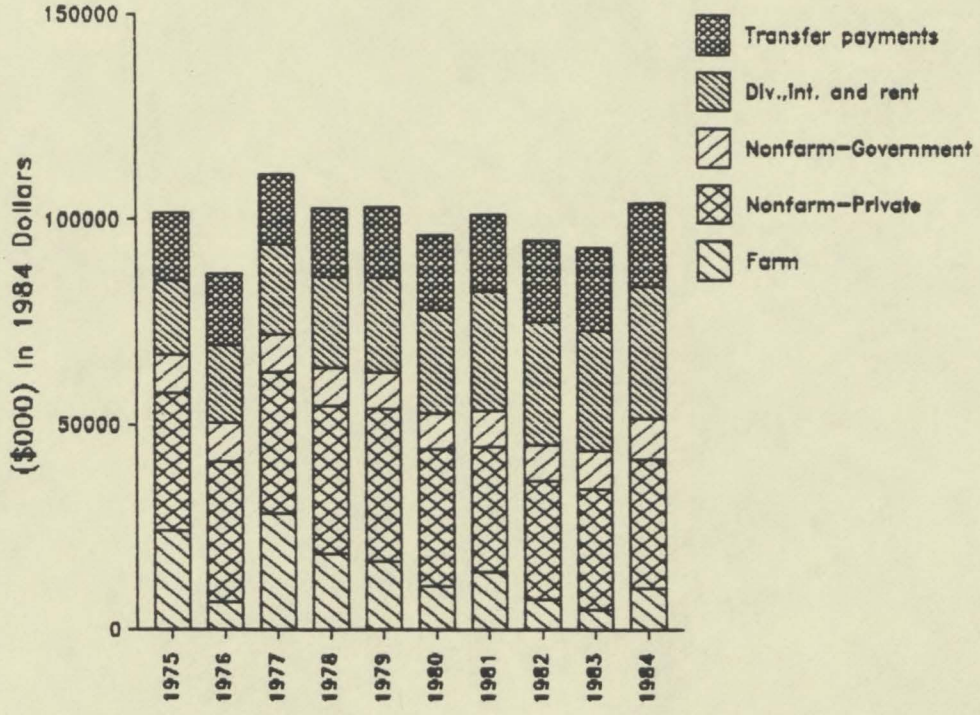


Figure 2. Personal Income in Pope County
Source: Figure prepared by Gordon D. Rose, Dept. of Ag & Applied Econ., U of MN, 1985.

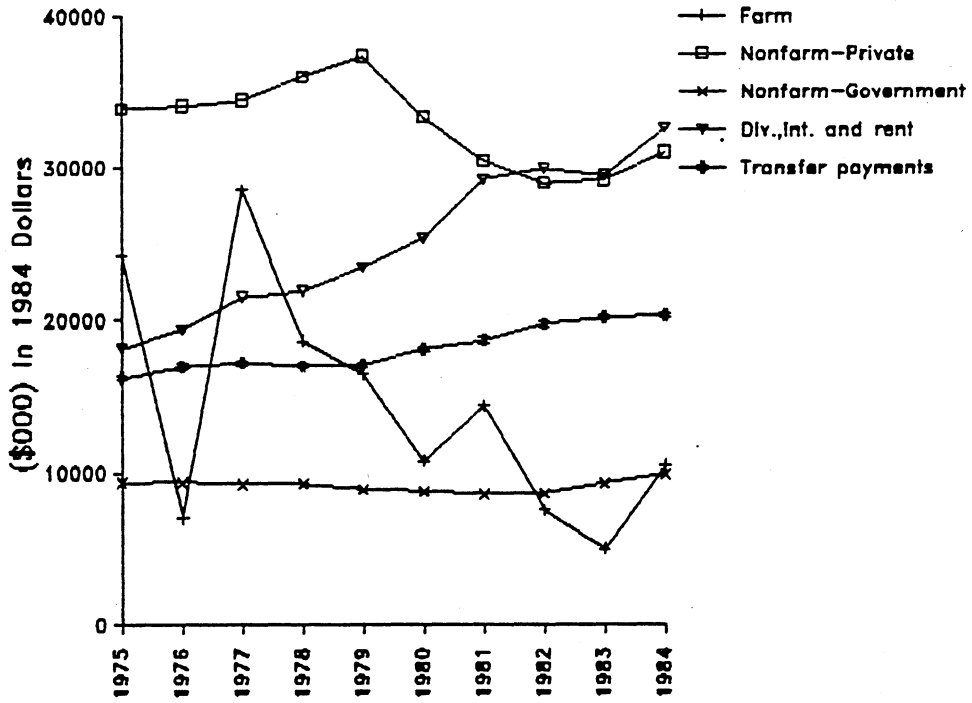


Figure 3. Personal Income in Pope County

Breaking down the transfer payments into the major sources, we can see that the majority (79.6%) of transfer payments are in the areas of retirement, disability, and health insurance benefits. See Table 18. This source of income has been increasing steadily. Income maintenance payments are sources such as welfare. They have remained fairly stable from 1977 to 1984.

Table 18. Percent of Transfer Payments by Major Sources

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Retire. disab.& health ins.	69.8	71.1	73.2	75.6	76.2	75.4	76.2	77.9	78.2	79.6
Unemployment ins.	6.8	7.4	6.7	4.4	3.9	5.3	4.8	5.3	4.8	3.2
Income maint. payments	6.3	6.0	5.4	4.9	5.6	5.9	5.8	4.5	4.9	5.1
Veterans benefits	8.9	8.2	7.6	7.2	6.8	6.2	6.1	5.9	6.0	5.6
Other gov't payments to ind.	1.8	.3	.3	.4	.6	.7	1.1	1.2	.8	.9
Total gov. payments to ind.	93.6	93.0	93.3	92.5	93.1	93.6	94.1	94.8	94.7	94.5
Business payments to ind.	3.1	3.0	2.9	3.0	3.0	2.9	2.8	2.6	2.8	2.9
Payments to nonprofit org.	3.3	4.0	3.8	4.5	4.0	3.6	3.2	2.6	2.5	2.6
Total transfer payments	100	100	100	100	100	100	100	100	100	100

Source: Major Sources of Personal Income, Bureau of Econ. Anal., April 1985. Figure 3 and Table 18 prepared by Gordon D. Rose, Dept. of Ag & Applied Econ., U of MN

In the area of nonfarm private personal income, Table 19 compares the changes in the various sectors of the economy. On a percentage basis, the services sector is the largest source of nonfarm private personal income. Durable manufacturing has fluctuated over the years, but is still the third largest source of nonfarm private personal income.

Table 19. Percent of Total Nonfarm Private Personal Income

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Ag.Serv.For.Fish,Other	1.24	1.78	1.93	.00	1.48	1.19	.00	1.82	1.72	1.69
Mining	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Construction	8.67	9.60	10.12	10.69	11.35	9.38	9.56	10.60	11.83	9.47
Manufact.-Non-Durable	2.09	1.74	1.69	1.80	1.71	1.67	1.77	2.09	2.10	2.18
Manufact.-Durable	11.87	12.59	15.55	17.07	20.72	20.90	16.22	12.69	10.27	15.97
Transport,Pub.Util.	9.76	11.03	12.17	12.43	12.26	12.50	12.93	12.58	11.55	10.96
Wholesale Trade	11.33	11.35	11.43	.00	10.84	10.68	.00	11.30	11.24	10.37
Retail Trade	21.71	22.84	21.33	19.16	17.85	18.17	18.36	18.77	20.00	19.41
Finance,Ins.Real Est.	4.36	4.59	5.10	5.14	5.19	5.28	5.52	5.93	6.66	6.28
Services	28.97	24.48	20.69	20.51	18.59	20.23	22.47	24.21	24.63	23.67
Residual	.00	.00	.00	13.19	.00	.00	13.17	.00	.00	.00
Total	100	100	100	100	100	100	100	100	100	100

Source: Major Sources of Personal Income, Bur. of Econ. Anal., April 1985.
Table prepared by Gordon D. Rose, Dept. of Ag & Applied Econ., U of MN.

Per capita income is the total personal income of the population divided by the total population, thus representing the average income per person in a population. It is a common income indicator that is used for comparison purposes. Table 20 compares Pope County's per capita income on a percentage basis to the surrounding counties. As of 1984, Pope County's per capita income has been fairly stable, but is still only 71% of Minnesota's per capita income. In comparison to the surrounding counties, Pope County has a relatively low per capita income.

The relationship between Pope County's per capita personal income and Minnesota's per capita personal income is portrayed in Figure 6. The tendency for the two to diverge is not as dramatic as it looks because these figures are in current dollars and the inflation factor has not been adjusted in the graph. However, it is evident that Pope County is below Minnesota's per capita personal income.

Table 20. Percent of Minnesota Per Capita Personal Income

County	1959	1962	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Becker	58	59	68	69	67	63	63	64	64	64	64	65
Clay	82	85	81	90	84	87	79	81	81	80	78	79
Douglas	70	71	73	70	73	72	72	71	73	73	73	73
Grant	55	56	102	83	88	85	78	80	89	79	78	86
Ottertail	65	67	76	71	75	75	71	71	75	74	83	83
Pope	63	65	83	68	81	73	73	71	75	71	69	71
Stevens	63	64	92	75	92	82	79	78	84	79	76	84
Traverse	51	54	102	75	81	79	71	76	82	74	75	88
Wilkin	63	62	103	85	78	96	82	84	89	78	82	90
Minnesota	100	100	100	100	100	100	100	100	100	100	100	100
Nonmetro MN	72	74	85	81	86	84	83	81	83	81	79	82

Source: Major Sources of Personal Income, Bur. of Econ. Anal., April 1985.
Table prepared by Gordon D. Rose, Dept. of Ag & Applied Econ., U of MN.

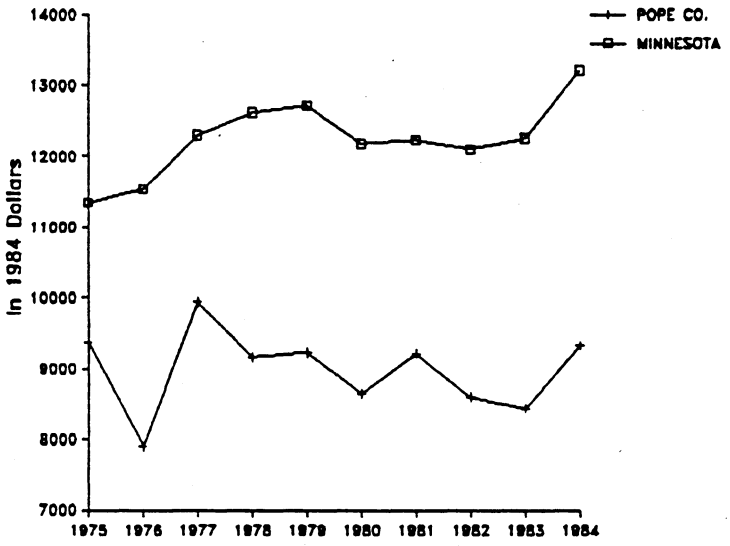


Figure 4. Per Capita Personal Income, Pope County vs Minnesota
Source: Figure prepared by Gordon D. Rose, Dept. of Ag & Applied Econ., U of MN. 1985.

Employment

A common measure of economic activity within an area is economic base analysis with employment data. Economic base has to do with how an area produces, distributes, and consumes its wealth. Table 21 illustrates the economic base analysis for employment in Pope County. Economic base can be used to determine the production level of a community. Nonbasic

industries are those that provide the necessary needs for the area. Basic industries are those that provide goods and services above and beyond the basic needs of the area. It is this basic industry employment that determines the community's economic base, and is important because growth depends on economic activity beyond the necessary needs of an area.

In Table 21, total county employment is broken down into basic and mixed industries. The average column is a comparison of Pope County's employment to the average of similar counties. It is important to recognize the strengths and weaknesses in Pope County by comparing its economic base to similar counties. The largest basic employment occurs in the farm and social security recipients industries.

Table 21. Economic Base with Employment Data-Pope County, Minnesota. 1984

Industry	Employment	Avg. Percent	Expected Employment	Basic Empl.	Percent of Basic
Totally basic industries:					
Farm	1584	10.3	0	1584	39.53
Mining	3	00.9	0	3	.07
Manufacturing	299	13.9	0	299	7.46
Federal Government	95	01.5	0	95	2.37
Social Security Recipients	1635	30.0	0	1635	40.80
Mixed industries:					
Contract Construction	276	03.4	231	45	1.13
Trans.,Comm.& Pub. Util.	175	03.0	204	0	.00
Trades	905	13.4	910	0	.00
Finance and Services	1222	12.9	876	346	8.63
State and Local Gov.	597	09.8	666	0	.00
Total County Employment	6791			4007	100.00
Base employment	4007				
Service employment	2748				
Base:Service Ratio	.69				
Economic Base Multiplier	1.69				

Source: Gordon D. Rose, Dept. of Ag. & Applied Econ., U of MN, 1985

Compared to the average percent of basic employment for similar counties, Pope County has a greater percent of basic employment in the industries of farm, federal government, and social security recipients. Other industries that may have employment potential compared to other counties are manufacturing; contract construction; transportation, communication, and public utilities; trades; finance and services; and state and local government.

In terms of the types of industries and percent of persons employed over 16 years old, Table 22 provides a comparison to the surrounding counties. The greatest percentage of 16+ employed persons are in the farm, fish, forestry, or mining category (27.6%), retail (14.5%) is second, and health service (10.0%) is the third largest employer. This is fairly consistent with the surrounding counties, except that Pope County along with Grant County, has the highest percentage of persons employed in the farm, fish, forestry, and mining category. In the retail category, Pope County falls a little behind most of the surrounding counties.

Table 22. **Industry Classification of Employed Persons 16 Years and Over by Percent**

Industry	Pope	Douglas	Grant	Kandiyohi	Stearns	Stevens	Swift	Todd
Farm,Fish,For.,Mining	27.6	12.9	27.6	12.2	10.1	18.2	23.5	25.5
Construction	5.1	6.1	7.0	6.6	5.2	6.1	5.3	5.0
Manufactured Goods:								
Nondurable	2.3	4.1	2.2	6.5	5.5	1.6	4.4	9.4
Durable	8.1	8.8	2.2	5.0	10.5	2.8	8.2	5.7
Transportation	5.2	2.6	3.4	5.1	4.1	2.8	3.4	4.3
Communication&Pub.Util.	0.8	3.5	1.3	2.4	1.9	1.6	2.9	1.3
Wholesale Trade	3.8	4.0	4.9	4.7	4.0	4.4	5.2	3.4
Retail	14.5	21.6	17.0	17.8	19.7	17.4	15.6	13.2
Finance,Ins.&Real Est.	3.0	3.4	3.8	3.8	3.5	3.3	4.4	2.9
Business & Repair Svc.	2.0	2.1	2.7	2.2	2.5	1.5	2.6	2.1
Personal,Entertainment Recreation	3.5	5.5	3.3	3.4	3.6	4.4	2.9	2.9
Professional & Related								
Health Service	10.0	10.4	10.4	14.9	9.3	7.0	7.9	7.5
Education Service	7.9	9.3	7.9	8.6	14.0	21.6	8.3	11.4
Other Professional	3.0	2.9	4.3	4.2	3.5	3.2	2.2	2.3
Public Administration	3.0	3.1	2.1	2.6	2.8	2.3	3.3	3.2
Total Employment	4473	11830	2674	15942	46877	4566	5082	9184

Source: U.S. Bureau of Census, 1980.

Occupational classifications of employed persons over 16 years of age differ slightly from the industrial classifications. In Table 23 the percent of Pope County's age 16 and older employed population is compared to the surrounding counties. Here again farm, fish, and forestry is the

largest percent of total employment, followed by other services (14.1%), and precision production, craft, repair (10.3%). Compared to surrounding counties, Pope County lags slightly behind in the percent employed in occupations of administrative, support, and clerical (8.6%) and handlers, laborers, equipment cleaners, and helpers (2.7%).

Table 23. Occupational Classification of Employed Persons 16 and Over by Percent

Occupation	Pope	Douglas	Grant	Kandiyohi	Stearns	Stevens	Swift	Todd
Managerial & Prof. Specialty:								
Executive,Admin,&Mgr.	7.2	8.2	7.0	8.0	7.8	9.3	7.4	6.3
Prof.Spec.Occupations	8.9	11.2	8.3	11.6	11.7	12.4	9.3	11.0
Admin. Support,Sales, Clerical,Technical:								
Tech/Related Support	2.1	2.5	2.1	3.0	2.3	3.0	1.9	1.9
Sales Occupations	7.7	10.9	9.8	10.3	10.1	7.9	8.0	6.7
Admin. Sup.,Clerical	8.6	10.9	10.6	13.2	15.2	13.1	11.4	9.4
Service Occupations:								
Private Household	0.6	0.5	0.5	0.5	0.4	0.7	0.5	0.5
Protective Service	0.5	0.8	0.2	0.6	1.2	0.5	0.5	0.7
Other Service	14.1	15.4	13.9	15.8	14.2	17.2	11.9	11.8
Farm,Fish, & Forestry	27.3	12.4	26.2	11.4	9.6	17.3	22.3	25.0
Precision Production, Craft, Repair	10.3	13.1	10.8	11.3	11.7	6.9	11.9	11.6
Operators,Fabri.,Labor:								
Machine Operators, Assemblers,Inspect	5.4	6.0	3.6	4.7	7.2	2.9	5.7	6.8
Movers, Transporters	4.7	4.2	4.1	5.4	4.2	5.2	4.3	5.4
Handlers,Laborers, Equipt Cleaners, Helpers, Laborers	2.7	4.0	2.6	4.3	4.2	3.8	4.9	3.1
Total Employed	4473	11830	2674	15942	46877	4566	5082	9184

Source: U.S. Bureau of Census, 1980.

Transportation inventory and evaluation

Highways

The county has six State highways considered trunk highways by the Minnesota Department of Transportation (DOT). These are highways 9, 28, 29, 55, 104, and 114. In the county, 123 miles of this highway classification exists.

County State Aid highways are highways that the county receives financial help from the state for upkeep, but actual maintenance is done

on the county level. Pope County has 45 of this type of highway, with a total mileage of 297 miles (Mn DOT, 1987).

Pope County also has 19 highways designated as County highways, totaling 66 miles (Mn DOT, 1987). Although it doesn't pass directly through the county, I94 of the interstate freeway system passes within 14 miles of the northeast corner of Pope County in an east-west direction in Douglas County. Interstate 94 and Minnesota State Highway 55 are the main transportation routes from the Twin Cities area to Pope County. The county is approximately 120 miles from the Twin Cities area.

Highway use in Pope County, in general, has increased (Mn DOT, 1987). The state highway system showed an increase in use of 6.3 percent. County State Aid highways had an increase of 27.4 percent. The greatest increase was on the county system, with an increase of 28.5 percent. The measure used to determine these results are total vehicle miles of use for all types of vehicles. The data on highway use for State and County State Aid highways indicate use on the roads within Pope County only.

Highway conditions are rated on the scale of 1 to 5, with 5 being a perfect condition. A rating of 2.5 is an indication that repair is needed (DOT, 1987). The following list pertains to state highways in Pope County and their ratings from 1985 to the present time.

Table 24. Pope County Highway Ratings

Highway number	Rating
9	3.8
28	3.5
29	3.4
55	3.7
104	3.5
114	3.6

Source: MN Department of Transportation, 1987. Transportation Information System.

Railroads

Glenwood is on a main line of the Soo Line rail company. Reciprocal switching is available. Piggy-back service is not presently available (MN Dept. of Econ. Devel., 1987).

Alexandria (Douglas County) has rail service by Burlington Northern and Soo Line. BN operates twice daily, and Soo Line once daily. Alexandria is located on the main line approximately 17 miles north of Glenwood (MN Dept. of Econ. Devel., 1987).

Airports

Glenwood's airport features a 3500 foot paved runway and a 2450 foot sod runway. Navigation aids include runway lights and markers, beacon, and windsock. A heated building is available and fuel is available. The distance to the Glenwood central business district is three miles. Charter aviation service is available.

Starbuck's airport features a 2500 foot lighted sod runway. Presently, no charter or commercial service is available.

Located in Douglas County, the Alexandria airport is well equipped with 5100 and 4100 foot paved runways. Navigation aids include lights, beacon, visual omnirange, omnidirectional approach lighting system, and visual approach slope indicator. Charter and small jet services are available (MN dept. of Econ. Devel., 1987).

Utilities

The following is a summary of general utilities: water, sewer, electricity, gas, and telephone in Pope County.

Starbuck Area.

Water: Water is supplied by wells. The pumping capacity of the wells is 450 gallons per minute. The available storage capacity is 75,000 gallons. The average demand for water in Starbuck is 169,920 gallons per day.

Sewer: The capacity for sewage treatment in Starbuck is 400,000 gallons per day. The average amount of sewage treated is 130,000 gallons per day.

Electricity, Gas, and Telephone service: Electricity is provided by Northern States Power Company. Gas is provided by Minnesota Natural Gas Company. Telephone service is by the Starbuck Telephone Company.

Glenwood Area.

Water: Glenwood's water supply is supplied by wells. The wells have a pumping capacity of 750 gallons per minute. Storage capacity for water in Glenwood is 691,000 gallons. The average demand for water is 504,000 gallons per day.

Sewer: The sewage treatment plant in Glenwood has a capacity of 2,700,000 gallons per day. The average amount treated is 560,000 gallons per day.

Electricity, Gas, and Telephone: Electricity is provided by Northern States Power Company. Gas services are by Minnegasco.

Telephone service is Northwestern Bell Company and AT&T (MN Dept. of Econ. Devel., 1987).

Media resources

The following is a summary of media resources in Pope County and the surrounding area:

Newspapers in the area include the Pope County Tribune of Glenwood, the Starbuck Times, Rural Minnesota News of Alexandria, and the Lake Region Echo of Alexandria. AM radio stations are located in Glenwood and Alexandria. The nearest FM stations are located in Alexandria. The nearest television station is the CBS affiliated KCCO in Alexandria.

RECREATION

III. RECREATION

Introduction

Historically, organized recreation has played a minor role in Pope County. A big reason for the minor role of recreation is the major role that agriculture has always played in this county. The long hard hours spent in the fields left little time for leisure type activities, especially physically demanding forms of recreation. A notable exception to this was the ski-jumping facility at Glenwood which enjoyed extensive use in the early 20th century.

Recent trends towards having more valued leisure time has created a sense for some type of "organized" recreation. Organized recreation being defined as "recreation that is unified and systematized for some specific purpose" (Brockman and Merriam, 1973). The continuing industrialization and advancements in mechanization has contributed to the increasing desire to supply the people with the wanted resources for their leisure time. Population growth and the changing structure of the population have also played a key role in the increased time for leisure, thereby, creating a demand for increased services to the people.

To give a better understanding of the recreation system and its potentials, the following section will give an inventory of present recreational development. Included in this inventory will be the existing designated recreation areas in Pope County (wildlife management areas, parks, and current resorts) organized by federal, state, county, municipal, and private jurisdiction. All of these will be represented on accompanying maps and tables. The next area recognized is the total designated recreation lands of the county with attached table similarly organized. Outdoor recreation in Pope County will be represented by a listing of the major activities on land and water in tabular form. Last, a brief discussion on indoor recreation and community programs and their importance to Pope County is presented. It is also important to recognize that large areas, not formally designated for recreation, may also provide recreational opportunities, e.g. hunting on farmland.

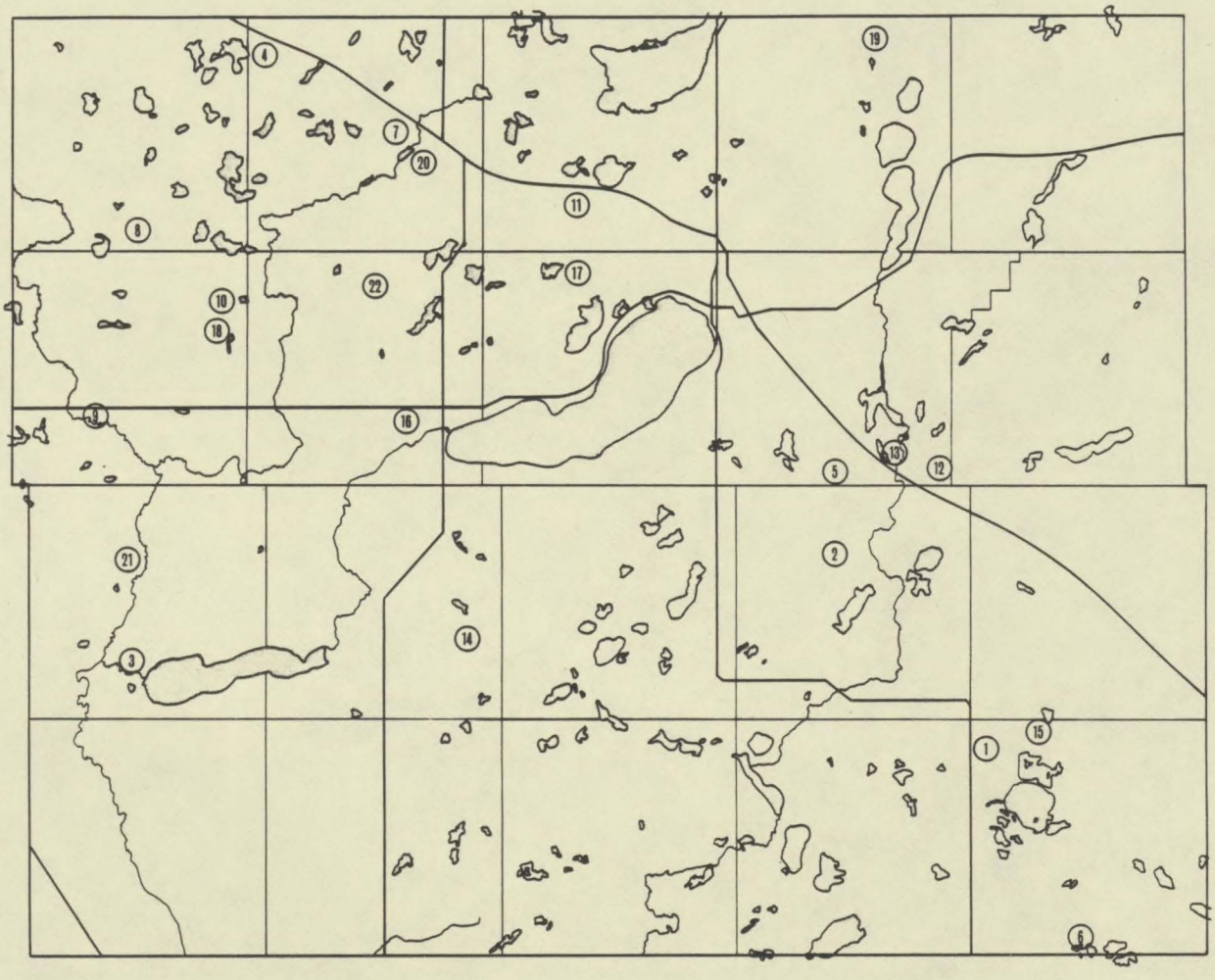
Inventory of Recreation Suppliers

Pope County has a variety of recreational opportunities available. Recreation areas in Pope County are supplied by governments at the federal, state, county, township, and city levels, as well as by the private sector. These recreation areas include wildlife management areas, resorts, and parks and are shown on Maps 9, 10, and 11, respectively.

Pope County has many individuals or families that own private resorts. The facilities offered are indicated, along with the name of the lake on which they are located on and the size of their property in Table 25 below and Map 10.

Map 9.

WILDLIFE AREAS



POPE COUNTY
MINNESOTA

N

0 2 4 6

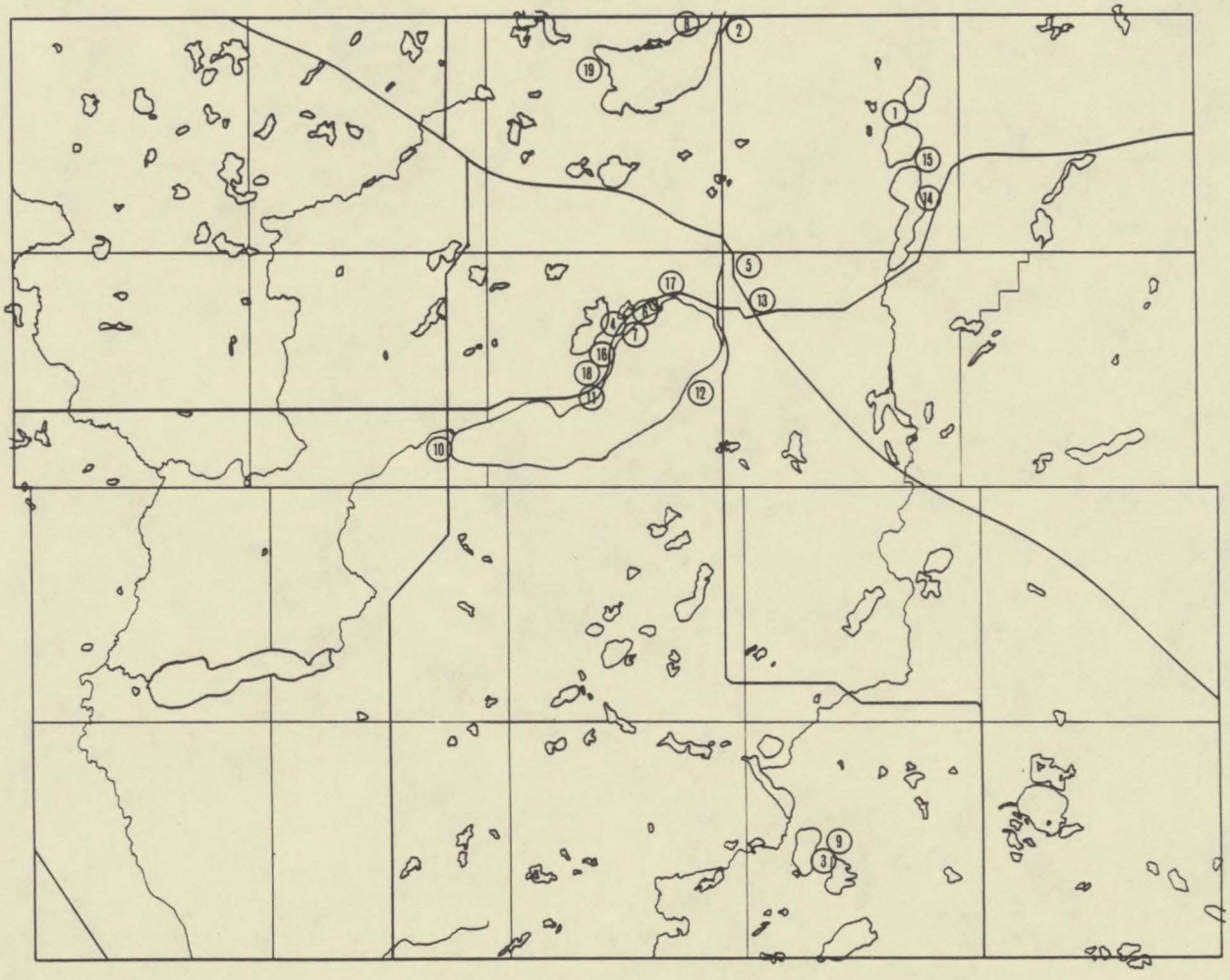
Miles

RCD 1988
UNIVERSITY OF MINNESOTA

Source: MNDNR Recreation Facility Data Base. 1987.

Map 10.

RESORTS AND CAMPGROUNDS



POPE COUNTY
MINNESOTA

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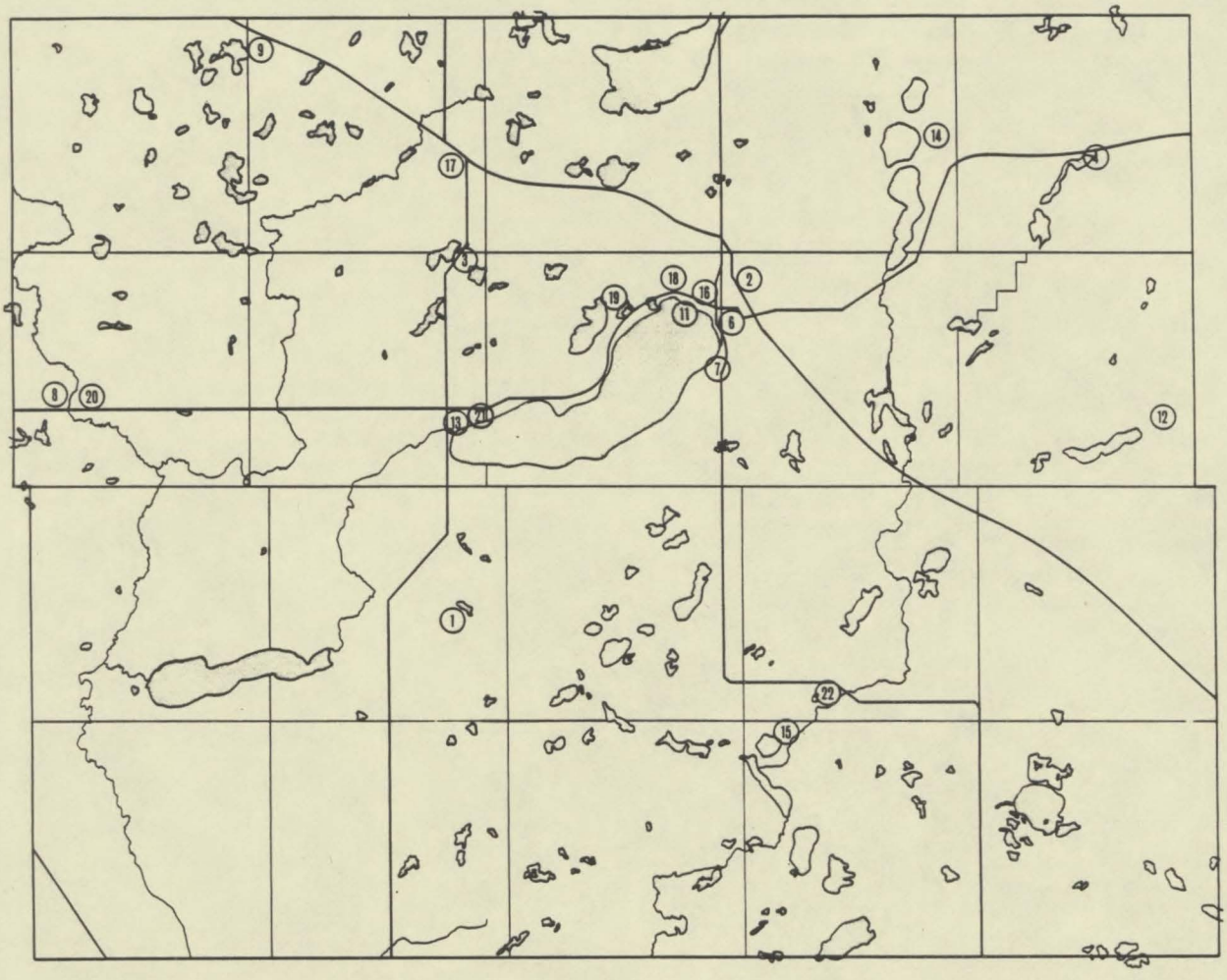
Map 11.

PARKS



POPE COUNTY
MINNESOTA

N

0 2 4 6

Miles

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Table 25. Private Resorts in Pope County

	Facility Name	Lake Name	Acres	L	C	P	S	A	D	T
1.	Canary Beach Resort	Villard		11	18		X	X	X	X
2.	El Reno Resort	Reno	6.5	2	40	X	X	X	X	
3.	Glacial Ridge Resort	Scandinavian			10					
4.	Green Valley Resort	Pelican	5.0	10	42		X		X	
5.	Hi-View Motel	Minnewaska			18		X			
6.	Hunt's Resort and Campground	Minnewaska	1.0	8	10	X	X		X	
7.	Kaldahl's Resort	Minnewaska	6.0	16			X		X	
8.	Lake Reno Resort	Reno	3.0	9		X	X	X	X	
9.	Lake Scandi Bait and Tackle	Scandi			10					
10.	Lakeview Motel and Campground	Minnewaska								
11.	Little Norway Resort	Minnewaska	1.8	6	4			X	X	
12.	Peter's Sunset Beach Resort	Minnewaska	100.0	45			X	X	X	X
13.	Scottwood Motel									
14.	Shady Rest Resort	Amelia	143.0	10	74		X	X	X	X
15.	Thor's Resort	Amelia	3.0	7	45	X	X		X	
16.	Torgy's Resort and Lounge	Minnewaska	3.0	4			X			
17.	Waskawood Resort	Minnewaska	10.0	7	33		X		X	
18.	Woodlawn Resort and Campground	Minnewaska	9.0	6	30		X	X	X	
19.	Reno Westside Campground				30				X	

L - number of lodging units
C - number of campsites
P - indicates a picnic area
S - indicates a swimming area
A - indicates a lake access
D - indicates watercraft available
T - indicates trails

Source: Minnesota DNR RECFAC Database 1987

Pope County contains parks that are owned by state, county, and city/township governments. In Table 26 the parks are divided by ownership, and indicate size, facilities offered. Map 11 shows the location of the parks and what lake, if any, on which the park is located.

Table 26. Public Parks in Pope County

Facility Name	Lake Name	C	P	S	G	W	R	F	T
(State Owned)									
1. Glacial Lakes State Park	Signalness	X	X	X		X	X	X	X
2. Glenwood Rest Area			X			X	X		
3. Malmedal Lake Rest Area	Malmedal		X			X			
4. Westport Lake Rest Area	Westport					X			
(County Owned)									
5. DATA Trail *									X
(City/Township Owned)									
6. Barsness Park and Chalet	Minnewaska	50	X		X	X	X	X	X
7. Chalet Campground	Minnewaska	X							X
8. Cyrus Municipal Park	Chippewa		X						
9. Farwell City Park				X		X	X		X
10. Glenwood Municipal Trail *									X
11. Glenwood Swimming Beach	Minnewaska		X	X		X	X		
12. Grove Lake Township Park	Grove		X	X	X		X	X	
13. Hobo Park Campground	Minnewaska	80	X			X	X		X
14. Knapp City Park	Villard	5	X	X	X	X	X	X	
15. Lake Linka Township Park	Linka								
16. Lake Side City Park	Minnewaska		X	X	X	X	X	X	
17. Lowry Community Park			X		X	X	X	X	
18. Mount Lookout Municipal Park			X						
19. Pelminsha Park	Pelican								
20. Riverside Park			X		X	X	X		
21. Starbuck Lakeshore Park	Minnewaska	2	X	X	X	X	X	X	
22. Terrace Mill Foundation Park									

C - number of campsites
P - indicates picnic area
S - indicates swimming area
G - indicates playgrounds
* - indicates not mapped

W - indicates drinking water
R - indicates restrooms
F - indicates athletic fields
T - indicates trails

Source: Minnesota DNR RECFAC Database, 1987.

Pope County contains state owned wildlife management areas. Table 27 below indicates the name of the areas, file number, and the size of the area.

Table 27. Wildlife Areas in Pope County

(State Owned) Facility Name	File #	Acres
1. Bangor WMA	W 677	80.0
2. Chippewa Falls WMA	W 916	75.4
3. Emily WMA	W 768	138.9
4. Farwell WMA	W 445	173.1
5. Heinks WMA	W 678	39.8
6. Little Jo WMA	W 447	214.3
7. Lowry WMA	W 380	254.4
8. New Prairie WMA	W 693	60.0
9. Noordmans WMA	W 735	309.3
10. Nora WMA	W 532	191.3
11. Reno WMA	W 670	56.0
12. Sedan WMA	W 293	452.1
13. Sedan Pond WMA	W 958	110.7
14. Signalness WMA	W 463	
15. Skarpness WMA	W 701	60.5
16. Starbuck WMA	W 992	2.7
17. Star Lake WMA	W 669	42.8
18. Van Luik WMA	W 703	46.6
19. Volkmann WMA	W 702	273.8
20. Wade WMA	W 361	79.2
21. Walden WMA	W 1114	20.5
22. White Bear WMA	W 692	98.3

Source: MnDNR RECFAC Data Base, 1987

Recreation Resources

Table 28 below shows the distribution of recreational land within Pope County by level of government. Federal agencies manage approximately 64 percent of the county's recreation land. State and private land represents 34 percent of the total recreation land in the county. The remaining 2 percent is administered through county, regional, and municipal agencies. Designated public and private recreational land-use represents 1 percent of the total acreage in the county.

Table 28. Distribution of Recreation Lands within Pope County

	Acres
Federal Land	8,621.2
State Land	4,319.4
County Land	29.0
Municipal Land	276.0
Sub Total	13,245.6
Private Land	309.1
Total Recreational Land	13,554.7
Total County Area	1,288,320.0 acres

Source: DataNet, 1987.
Note: Pope County Area = 2,013 sq. miles = 640 acres per sq. mile (2013) (640)= 1,288,320 county acres

Outdoor recreation

The "major" recreational activities in Pope County listed below were stated as major activities by the Minnesota State Comprehensive Outdoor Recreation Plan (SCORP) 1984-1989. "Major" is defined by SCORP as activities that are in the upper 50% of the state total for use.

Playing Outdoor Games	Hunting
Picnicking	Boating
Camping	Snowmobiling
Cross-country skiing	Canoeing
Bicycling	Riding Horses
Swimming	Fishing
Ice Skating	Hiking
Golf	Softball
Sledding	

Based on user studies made by MnDNR, fishing (both winter and summer), snowmobiling, bicycling, hunting, and boating are among the most important current activities in Pope County. The interest in these activities can be primarily attributed to the nature of the land in Pope County. A number of area requirements for these activities are satisfied by the presence of the many lakes in the county and the rich habitat types and topography. These land characteristics are attractive for diverse recreation opportunities to take place. Other activities that showed community interest were picnicking, ice skating, softball, and sledding (Mn DNR-SCORP,1984-1989).

Hunting and fishing regulations

All regulations in the area of fishing and hunting are identified in the Minnesota state regulations which can be obtained at any Department of Natural Resources office. One law that might affect the land owners

in Pope County is the Trespass Law. This states that permission is required to enter or operate vehicles on agricultural lands, except when retrieving wounded game or dogs. A license is required to hunt and fish anywhere within the state.

Indoor recreation

Local government and local organizations in the county are responsible for indoor recreation. Indoor activities for this discussion pertain to those activities undertaken by community or noncommunity residents in a facility and/or building provided within the county or private investment for the enjoyment of a particular recreational experience. Coordination of these activities should be done in order to include participation of the entire county. High in importance are leadership training programs and human interaction programs. Human interaction programs are important because they provide for community growth and development (Lutzin, 1976).

At present, new emphasis is being placed on both the relationships between resources and leisure uses and schools and education. The existing school facilities in Pope County serve as an important resource for the implementing and development of various recreational programs. Coordination and most importantly cooperation between school, park, recreation, and city authorities in meeting of community needs for indoor and outdoor recreation is necessary for the success of the community programs. Pope County's local community organizations also serve as an integral part in supplying recreational needs to the county. Indoor activities of the kind carried out within the county would not tend to have a real impact on the county's ability to draw people to the county. The activities of an indoor nature are primarily for the benefit and enjoyment of the community and county residents and are not meant to be a tourism attraction, but the possibility does exist that these activities could be upgraded or enhanced to become tourism attractions.

Listed below are various community programs and activities which are provided to the people of Pope County, as listed in the Pope County Fall and Winter 1987 Activities Brochure:

Hobby Programs	-arts classes and crafts classes
Sewing/Cooking Programs	-patchwork, chinese cooking, cookie baking, and basic microwaving
Special Interest Classes	-farm business management education, crime prevention, photography, beauty and make-up classes, introduction to computers, and early childhood family education
Foreign Languages	-spanish and german
Physical Fitness/Health	-c.p.r classes, expectant parents classes, and nurses-aide classes
Sports, Fitness, and Dance	-introduction to fishing techniques, bicycling clinics, and beginning golf
Recreation	-volleyball, racquetball, bowling, and basketball

Analysis

Recreation needs

Population characteristics are a very important determinant of recreational demands. Therefore, a close observation of Pope County's changing population composition, distribution, and size will give insights towards determining current and future recreational criteria within the county.

The population in Pope County is increasing at a very slow rate. The area that seems to have the greatest amount of increase is in the rural nonfarm sector. The population of the urban centers has remained rather constant, while the population of the rural farm community has steadily fallen. Since potential growth exists in the area of rural nonfarm population local recreational opportunities for the county should be focused on development in these areas.

One question that may need to be answered is, how could the changes in population affect the demand for recreation in the county at the present time and in the future?

The first step in answering this question is to define the word recreation. Recreation is referred to here as the undertaking, by people, of an activity during their leisure time which gives them a sense of, according to Webster's Dictionary "...refreshment in body or mind, by some form of play, amusement, or relaxation." Recreation for this discussion will be only those activities participated in outside the home, i.e., recreational activities fulfilled at a facility or designated area provided by a private or public organization.

Recreation can mean different things to different people. People can define recreation as camping in an area where one parks his trailer, sits at a picnic table, eats with plates and utensils, and gets one's water from a park spigot. Others see recreation as a experience where one has none of the amenities of the above, one has to eat on the ground, sleep on the ground, and get water from a lake or stream. Brockman and Merriam state that, "The recreation analyst must keep in mind all possible methods of recreation and try to maximize user satisfaction by providing a variety of recreational opportunities for the varied interests and activities of all the people" (Brockman and Merriam, 1973).

With a basic understanding of recreation, one can begin to answer the question of the effect that population has on Pope County recreation. One of these effects will be a greater variety in the types of recreation people will want. This increase will be caused by the greater number of people coming into the county. New facilities may therefore be developed if there is enough interest in an activity.

Pope County, in comparison to surrounding counties, has a large mature population in the age range of 56-64. This type of age structure suggests a different approach to management with facility design catering

to a less active lifestyle but it is also possible older people in the future may be more active than current population. It must also be considered whether this is the true population of interest or if the county wants to focus its attention on attracting visitors from outside the county or state. If the county focus is to bring in outside clientele it must also be considered what type of person the county wishes to attract (e.g. families, sportsmen and other outdoor enthusiasts).

Some difficulties that arise from marketing for different types of people is that they are all looking for different recreational experiences. Older populations generally require more structured facilities with easy access as a main concern. For other types of outdoor enthusiasts, a positive recreational experience may include nature oriented activities that would require few structured facilities. In Pope County the needs of people that enjoy more primitive situations have not been adequately provided since most of the existing recreation areas are geared towards the structured type facilities.

Conflicts

The idea of competing land uses is a critical issue in today's society. With the increasing average age of Pope County's residents, the new facility demands required for this older group may cause tension with younger groups. For example, trails that were once narrow dirt paths, may now need to be made into wider, paved paths to make them accessible to wheelchairs. The new paved paths may make the trail more accessible to everyone, but it may also detract from the "recreation experience" of someone who wants to get away into the wilderness. With the decreasing amount of recreational land available, the needs of everyone have to be taken into account, and provisions need to be made for people whose type of facility has been converted to another use (MnDNR-SCORP, 1984-1987).

Another area of possible conflict could be in the further development of Pope County lakes. The past trend for many people seems to have been the building of a cabin or other type of "weekend getaway." While a cabin on one of Pope County's lakes would be nice for the owners, the site of a structure of any kind could detract from the experience of someone else who may be fishing or enjoying a canoe ride across the same lake. It may be advisable to require new builders to build a certain distance from the shoreline to maximize the aesthetic beauty as well as access for all concerned.

In providing walking, snowmobiling, cross-country, and bike trails, people should have a multitude of places to choose. The development of these trails would have to be backed by people who live in the county. It would involve the change of land ownership or use of easements and good behavior by trail users. If this could be done the people of the county would have a unique system with greater potential for development and service in the future. The people of Pope County have control in these land use decisions and alternatives may provide better use of the land for all. It is also important to remember that each recreation

facility has a direct affect on the land and its uses and everyone has their own ideas about how the land could be used. Planners should be aware of this because each additional recreational facility will have some varying degree of effect on the overall appearance and activities in the county.

TOURISM

IV. TOURISM

Marketing

Marketing plays a very important role in the tourism industry. A good marketing program can be a key factor to increasing tourism in Pope County. A number of strong travel orientated communities working together on regional promotion, results in a stronger destination image, a greater variety of attractions and facilities under market exposure and a healthy degree of competition that spurs improvement (U of M Extension Service, 1987). Developing a unique identity to promote to tourists, will set the community apart from the competition.

The University of Minnesota Tourism Center suggests the following steps in marketing tourism. In developing a market approach to tourism, it is important to first analyze the current situation. Determine what attractions exist that draw visitors to the area and the quality of the visit. Does the community have enough hospitality services to meet tourism demands? An analysis of the current promotion methods and their effectiveness will help determine what methods may be used again.

Another part of marketing is determining what type of tourism the county wants to promote and defining a target market in which to channel marketing efforts. The tourism experience that the community provides now is a good indicator for the future. It is often easier to market and modify a travel experience that has evolved over time and is built on local flavor than to introduce and develop a new form of tourism (U of M Extension Service, 1987).

When promoting specific activities, assess what type of tourism is compatible with the local lifestyle. For example, many residents of northwest Minnesota enjoy the resources of the area hunting opportunities. They use the same resources as nonlocal hunters use. Conflict over resource use must be negotiated before hunting is promoted as a primary visitor attraction

After the analysis is complete, it will be helpful to set specific goals and objectives that the community wants to accomplish within a set period of time. This will help keep the community on track and indicate when it is time to review and shift strategies.

For further information related to marketing and tourism the Tourism Center at the University of Minnesota Extension Service, provides a vital link between University research and Minnesota's tourism industry. The information above was obtained from one of their publications entitled, Community Travel and Tourism Marketing, 1987.

Expenditures

The Minnesota Office of Tourism compiles data on 1986 gross sales from lodging establishments (in thousands of dollars), estimated visitors

for Pope County, total travel expenditures, travel generated payroll, travel generated employment, state tax receipts, and local tax receipts.

The average expenditures per visitor in Minnesota during 1985 was $129.09. In Pope County that same year the average expenditures per visitor was $155.00. Pope County received $5,863,000 from travel expenditures from an estimated 37826 visitors (MnDNR, Office of Tourism. 1986).

Table 29 below is a comparison of gross sales from lodging establishments by county.

Table 29. Gross Sales From Lodging Establishments

(Thousands of Dollars)

County	Quarter of 1986 1	2	3	4	4 Qtr Total(86)	1986 Total	1985 Total
Pope	**35**	**278**	**502**	**60**	**875**	**920**	**735**
Stevens	--	310	338	331	979	1338	1377
Douglas	1659	2547	3838	1716	9760	9825	10127
Swift	26	49	51		177	179	183

Source: Tax Research Division, Minnesota Dept. of Revenue, 1987.

Douglas County may have higher gross sales than the other counties due to its proximity to the main travel route of Interstate 94. Higher gross sales could also be attributed to the fact that this county has a tourist image, as a county with many lakes and resorts. Travelers are more likely to stop in Douglas County. Also there would be a greater demand for lodging facilities and therefore more money coming into the county.

Table 30 below shows the economic impact of travel on Pope County as well as other counties in the area. Douglas County is generating a larger payroll and employment expenditure than any of the other three counties compared in this table. Pope County is doing better than Swift County in all areas listed on the table. This could be due to the present tourism within Pope County.

Table 30. Economic Impact of Travel

County	Total Travel Expenditures	Travel Generated Payroll	Travel Generated Employment	State Tax Receipts	Local Tax Receipts
Pope	**5,863**	**1,081**	**138**	**346**	**37**
Stevens	9,703	1,843	248	642	64
Douglas	67,867	13,035	1,788	4,655	452
Swift	3,935	641	59	115	22

Source: U.S. Travel Data Center. 1985.

Major trends in tourism

There are many changes taking place in the nation that will have an impact on the tourism industry in Pope County. Some of the demographic trends that will effect tourism are: the coming of a labor shortage, growth of retiree population, and the availability of leisure time.

Youth born in the "baby boom" era are now in the labor market. By 1995, the labor force entering the market will decline by 10% (Koth, 1987). This trend will have its biggest impact on the service industries, such as food services, resorts, and hotels that rely on entry-level positions to conduct business. Key strategies to overcome this will be to improve recruiting, increase productivity, increased training and special benefits, and employ more part-time and elderly workers (Koth, 1987).

From the years 1970 to 1980, there has been an increase in Minnesota in persons over the age of 50 by 7.1% (Koth, 1987). They now comprise 25.3% of the state's current population, and are the most affluent of all age groups in the state (Koth,1987). The elderly are living longer, and retirement programs allow for earlier retirement. This allows for more free time to participate in travel and leisure activities.

There are two major trends that are reducing the amount of leisure time for working adults. The first is: the number of hours the average American works has increased from 40.6 hours in 1973 to 48.8 hours in 1987 (Koth, 1987). The second is: the number of women in the work place has increased.

The impact of these trends has made it more difficult for two income families to coordinate mutually-agreeable blocks of vacation time together. Two or three day get-a-ways are becoming more popular. Leisure time is becoming more valuable, therefore people will demand improved quality of experience and value in their leisure time. The tourist wants an upscale experience. They are looking for luxury and convenience such as, microwaves and air conditioning in their cabins (Mpls. Star Tribune, 1987). In the Brainard and North Shore area, there has been a trend toward vacation packaging. This is where a hotel or resort gets together with a restaurant and a place of entertainment and offers customers a package deal to save time in planning a vacation.

Potential ways to increase tourism

Pope County can undertake many strategies to increase tourism in the county. The county has a wonderful natural resource base that can be used to increase tourism while maintaining its unique natural atmosphere. These ideas point out a few major areas that could possibly be expanded, but do not include all the possibilities for tourism in the county. Each idea must be further examined to determine its feasibility as a project and if it would be compatible with the lifestyle of the local community.

1) Pope County has large Norwegian and German population that possess the skill of making the old ethnic crafts and cooking the ethnic foods. This population could be surveyed to determine those who would want to sell their crafts and foods or might teach the skill to others. It has been suggested that the Lowry School be used as a center to sell, display crafts.

2) Since the average age in Starbuck is 55 years old, it may be to Starbuck's advantage to use this already established population to develop a retirement community. Interested persons should refer to the Grand Rapids report located in Appendix B.

3) The large population of seasonal owners in Pope County may be surveyed to determine if Pope County can service them more completely. An example is to develop a service to allow people to rent out their cabins when they are not in use by the owners.

4) Pope County's beautiful natural areas may be used to develop more nature based activities. These might include such things as: cross country skiing, hiking, hunting, biking, educational nature hikes, bird watching, etc.

5) It may be to Pope County's advantage for communities to work together to develop tourism and provide tourists with a wide variety of activities and choices. By doing this, the communities will not be competing with each other, but will enhance tourism in the area by giving tourists a variety of choices. Pope County may be able to expand upon the already developed tourist market from Alexandria, by offering the tourist something they can not find in Alexandria, thereby enhancing the tourist industry for both areas.

6) Pope County may also want to utilize services that the state currently provides to promote tourism such as, Minnesota Office of Tourism "Heartland Region."

AGRICULTURE

IV. AGRICULTURAL LAND USE PRACTICES

Introduction

The objective of this section is to evaluate existing agriculture related land use practices in Pope County and attempt to identify potential directions both the county and individuals may go in order to strengthen and enhance agriculture. This section of the report will include agriculture production statistics, agriculture land use, alternative land uses, governmental programs and environmental impacts related to agriculture practices. Where applicable, we have compared information from Pope County with that from Douglas, Stevens, and Swift Counties in particular as well as other counties in the West Central Region. Douglas, Stevens, and Swift Counties were chosen because of their geographic proximity to one another in addition to geological and environmental similarities. Such comparisons will be beneficial in evaluating potential areas of development in Pope County.

Farm statistics

Throughout the state, the numbers of farms have been declining. Between 1985 and 1986, Minnesota lost 3.13%, of its farms bringing the 1986 total to 93,000 (Mn & USDA, 1987). There are currently 1100 farms in Pope County. Of these farms, 17.7% experienced foreclosure in the past year, with an additional 10.5% currently undergoing mediation. It is estimated that half of these farms will end in foreclosure with the remainder being resolved (Morris, 1987).

Minnesota's average farm size is 323 acres as of June 1986, with an average value of $515/acre. In Pope County the average farm size is 330 acres with a value of $500-600/acre for highly productive land and $200/acre for poor quality land. Rented land ranges from $50-25/acre/year based on productivity levels (Mn & USDA 1987).

Table 31 shows total cash receipts received by farmers in Pope County as well as three counties in the West Central Region used for comparison. Pope County ranks third out of the four counties in 1983 and 1984 for total receipts. It ranks second in livestock income and 3rd in crop income and government payments. Between 1983 and 1984 total cash receipts were down 9% for Pope County as well as the West Central region overall.

Land Values

The value of Minnesota farm real estate fell in 1986 for the 5th consecutive year. Average estimated value of farmland for the first half of 1986 was $515 per acre, 25% lower than the same period the previous year and tne lowest since 1974. This continues a trend consisting of declines of 10% from 1981-82, 10% from 1982-83, 13% from 1983-84, and 25% from 1984-85. In current dollars, prices and values have not yet fallen to the 1972 "pre-boom" levels of $248/acre.

When real estate values are adjusted for inflation, the average value of $515 in current dollars is $158 in constant (1967) dollars. To find a constant dollar value below the 1986 level, it's necessary to go back to 1956 when the constant dollar price was $155.

Dividing Minnesota into 6 districts (see map), estimated values fell by between 15% and 30% in each district. Of the 6 regions, the southeast had the largest decline (30%) while the northeast had the smallest (15%). The most valuable farmland is still in the southwest district.

ESTIMATED LAND VALUES PER ACRE IN 1986 AND CHANGE FROM 1985
(Excluding Hennepin and Ramsey Counties. Based on reported estimates of average value per acre of farmland for the first 6 months of 1986.) *

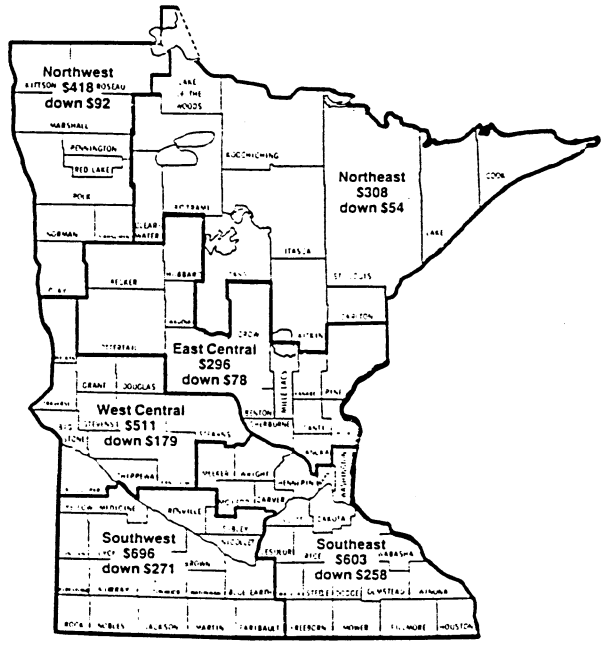


Figure 5. Estimated Land Values per Acre in MN
Source: USDA. "MN Agriculture Statistics, 1987."

Table 31: Cash Receipts Received by Farmers

District & County	1983 Crops	1983 Live-stock	1983 Gov't. Paymts.	1983 Total	1984 Crops	1984 Live-stock	1984 Gov't. Paymts.	1984 Total
		Million Dollars				Million Dollars		
Minnesota	3,008	3,569	611	7,188	2,808	3,512	530	6,890
W. Central	489	426	115	1,030	453	424	70	947
Pope	**25.4**	**39.5**	**7.6**	**72.4**	**24.2**	**37.8**	**4.5**	**66.5**
Douglas	11.6	42.7	3.5	57.8	10.8	41.2	3.1	55.0
Stevens	34.2	42.5	9.1	85.9	31.7	42.7	6.3	80.7
Swift	55.8	33.6	15.4	104.9	51.7	36.4	6.8	94.9

Source: Minnesota Agriculture Statistics. 1987. Minnesota and United States Department of Agriculture. Page 10. Note: County estimates on farm income are currently undergoing revision by the US Department of Commerce; 1985 county data will not be available until the spring of 1988. The 1988 issue of MN Agricultural Statistics will carry 1985-1988 data.

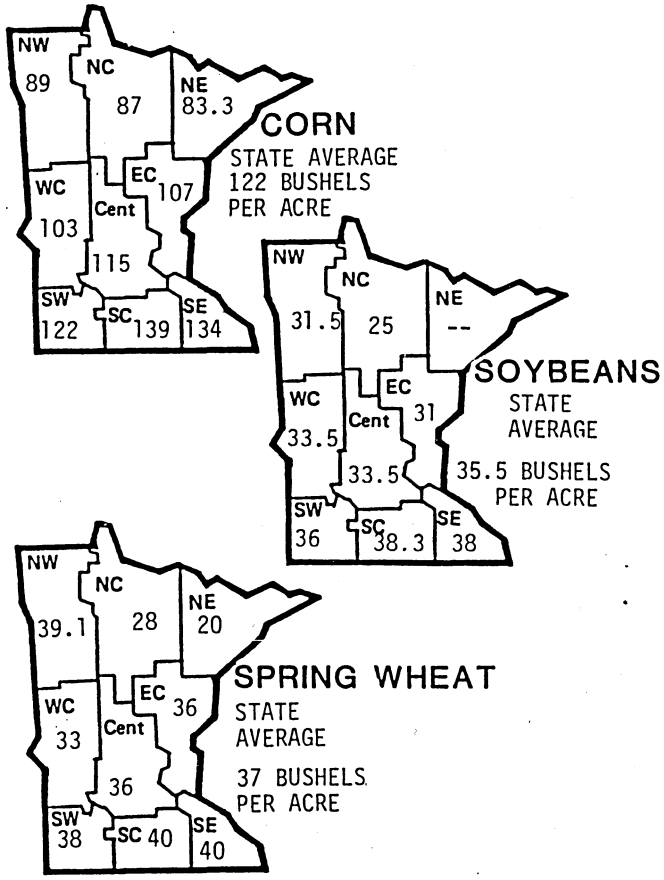


Figure 6. 1986 Average Crop Yields in MN Crops
Source: USDA. "MN Agriculture Statistics, 1987."

Land use practices

Tables 1 and 2 in Appendix E show nonfederal land and cropland use respectively in Pope County, with relation to land capability class. As shown in Table 1 the majority of land is in cropland, followed by pasture.

Figure 7 also shows the 1986 geographic distribution of major crops in Minnesota. In the West Central Region, Pope County produces above average quantities of corn and oats and average quantities of soybeans and wheat.

Table 32 below describes cash receipts received per crop in 1986 for Pope, Douglas, Stevens, and Swift counties.

Table 32: Cash Receipts Received per Crop, 1986 in Pope, Swift, Stevens, and Douglas Counties.

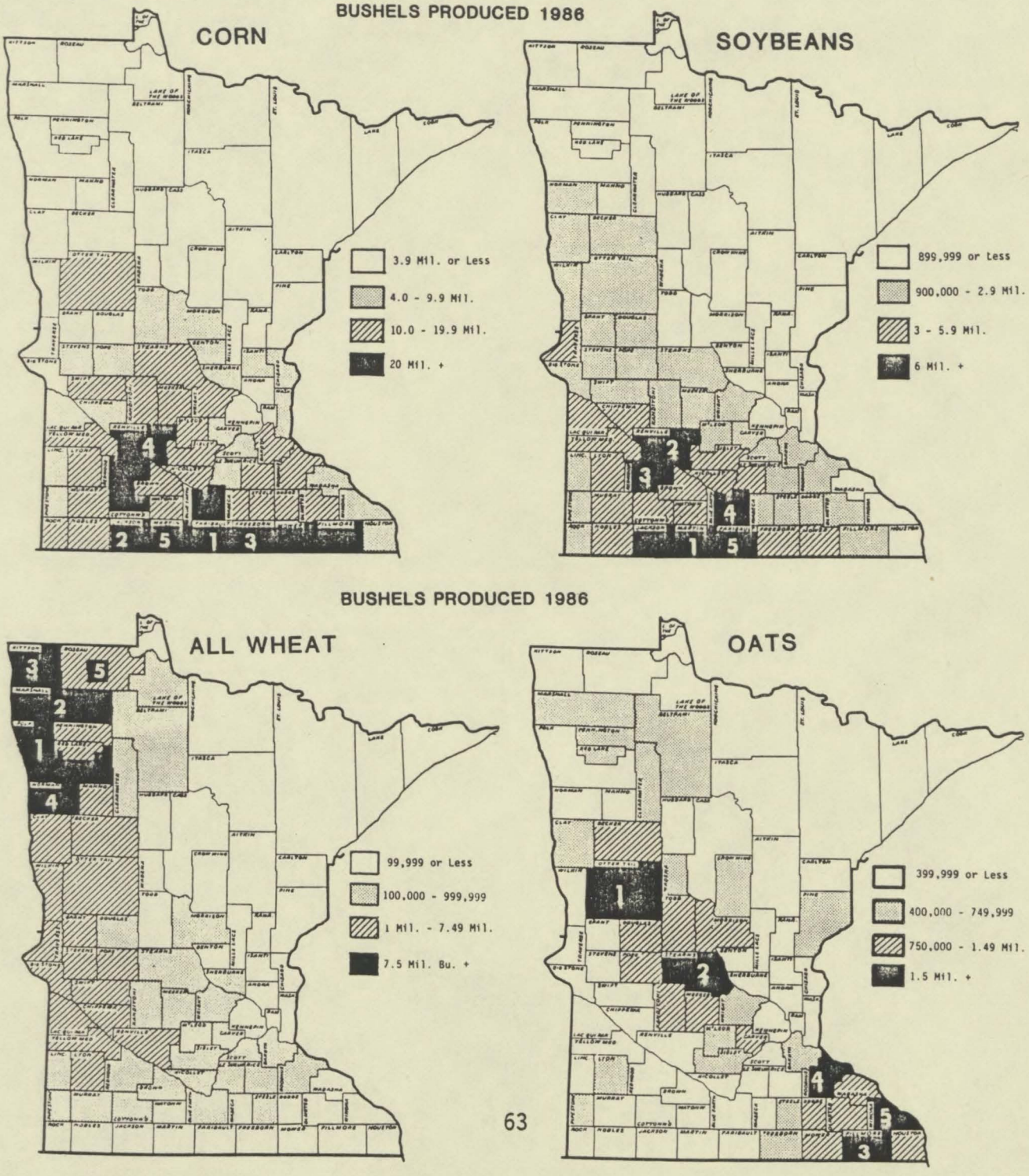
MN Avg. Season Price		Pope County Production	Pope County Income	Douglas County Production	Douglas County Income
Corn	$1.40/bu	5,844,600	$8,182,440	$3,138,000	$4,393,200
Soybeans	4.55/bu	1,080,000	4,914,000	988,200	4,496,310
Oats	1.25/bu	780,000	975,000	1,292,000	1,615,000
Barley	1.35/bu	144,400	194,940	266,400	359,640
Rye	1.45/bu	10,200	14,700	67,200	97,440
Wheat	2.35/bu	1,022,100	2,401,935	552,100	1,297,435
Sp.Wheat	2.35/bu	1,008,000	2,368,800	511,500	1,202,025
Hay	53.50/Ton	93,900	5,023,650	151,400	8,009,900
Ed.Beans	23.10/Cwt	10,800	249,480		
Sw. Corn	53.80/Ton	600,600	355,080		

MN Avg. Season Price		Stevens County Production	Stevens County Income	Swift County Production	Swift County Income
Corn	$1.40/bu	8,624,000	$12,073,600	13,207,600	$18,490,604
Soybeans	4.55/bu	1,080,000	4,914,000	988,200	4,496,310
Oats	1.25/bu	153,000	191,250	100,700	125,875
Barley	1.35/bu	688,800	929,880	105,600	142,560
Rye	1.45/bu	23,100	33,495	31,500	45,675
Wheat	2.35/bu	1,989,200	4,674,620	2,196,300	5,161,305
Sp.Wheat	2.35/bu	2,173,500	5,107,725	3,075,800	7,228,130
Hay	53.50/Ton	35,900	1,920,650	43,200	2,311,200
Ed.Beans	23.10/Cwt	20,800	480,480	20,800	480,480
Sw. Corn	53.80/Ton			6,000	322,800

Source: Minnesota Agriculture Statistics. 1987. Minnesota and United States Department of Agriculture. Information compiled from pages 28-52.

Figure 7. Geographic Distribution of Crops in MN (goes here)
Source: USDA. "MN Agriculture Statistics, 1987."

Geographic Distribution of Major Minnesota Crops in 1986



Although the yields in Pope County for specialty crops such as sweet corn, snap beans, adzuki beans and cucumbers are very good, marketing problems and plant diseases currently prevent these crops from being feasible and reliable alternatives. At the present time, Pope County has the potential to grow many different alternative crops. The types that should be grown depend on a number of variable markets. As a general rule, a market assessment should be done for each crop considered. Types of variables to be examined are: distribution companies or wholesalers, consumer profiles, competitors producing the same crop, developments in that particular crop industry, and environmental factors pertaining to that particular crop (Morris, 1987).

After all of these elements are addressed, the individual farmer must decide whether or not a particular crop is feasible. An example already in place in Pope County is the buckwheat market that has been developed by an elevator in Villard with room for some limited increase in production.

A strategy for existing crops, e.g., developing alternative uses for currently produced crops, is another area for potential growth. For example, if ethanol was promoted as a viable fuel source, the demand for corn could increase and improve the prices received by farmers for their product. For more information on alternative uses for corn refer to Appendix C.

Livestock

As seen in Figures 8 and 9 trends in livestock production in Minnesota show a slight emphasis away from dairy and beef towards hogs and sheep. Turkey and broiler numbers are low in the county and are thus relatively insignificant in terms of total agricultural income. There does seem to be a potential market for sheep milk in the future if a processing plant was developed in the area (Morris, 1987). Roquefort cheese, made from the milk of Freshin sheep, is one product the county could use to diversify its livestock operations.

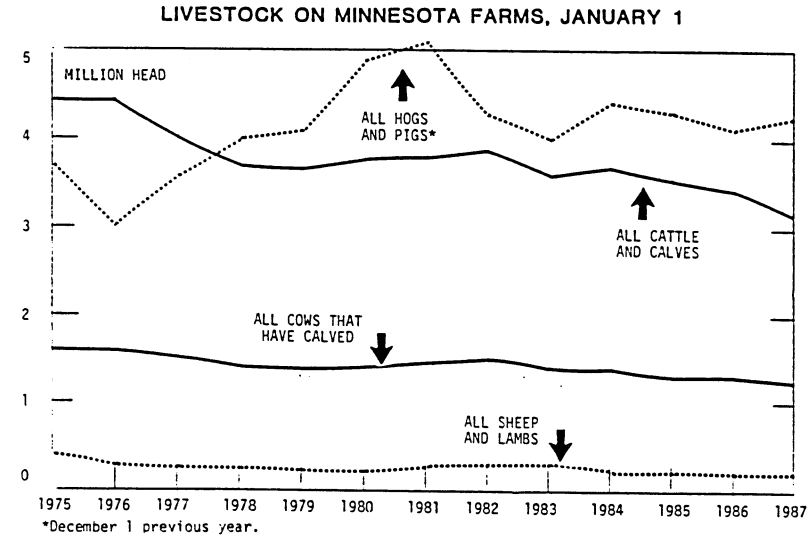


Figure 8. Livestock on Minnesota Farms
Source: USDA. "MN Agriculture Statistics, 1987."

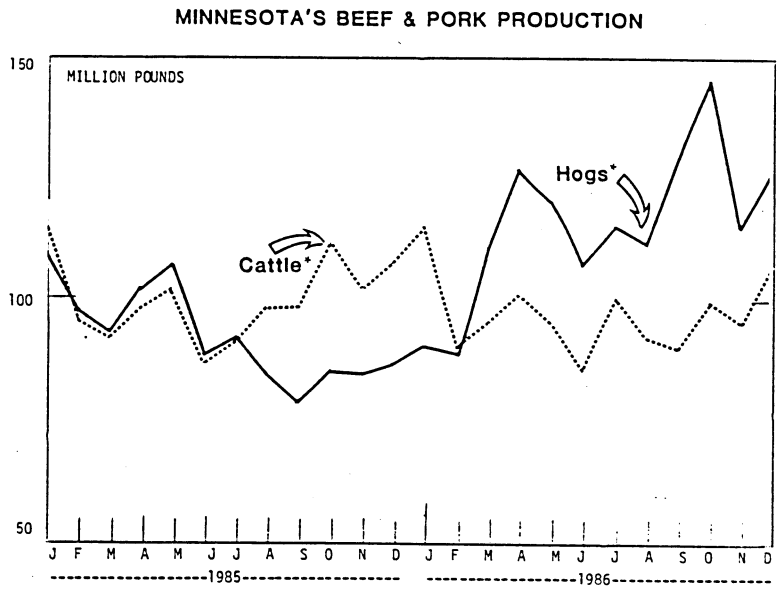


Figure 9. Minnesota's Beef and Pork Production
Source: USDA. "MN Agriculture Statistics, 1987."

Table 33: Livestock Production Comparisons

	Pope	Douglas	Swift	Stevens
Beef Cows				
Jan. 1 inventory				
1986	3800	4700	3700	3000
1987	5300	5400	3800	2600
Milk Cows				
Jan. 1 inventory				
1986	14,500	20,500	4400	1600
1987	14,000	19,500	3700	1500
All Hogs				
Dec. 1 inventory				
1985	24,600	17,500	40,700	52,000
1986	21,500	16,600	46,900	43,900
Annual Farrowings				
1985	6600	5400	8400	12,800
1986	6000	4500	8900	11,100
Annual Pig Crop				
1985	52,300	42,800	66,500	101,400
1986	48,300	36,200	71,700	89,400
Sheep and Lambs				
Jan. 1 inventory				
1986	900	1900	1100	1400
1987	900	1900	1100	1700
Annual Average				
Hens and Pullets of Laying Age				
1985	49,000	1900	12,000	114,000
1986	44,000	1700	11,000	112,000
Annual Average Rate of Lay				
For all Counties: 1985 245				
1986 247				
Total Egg Production				
(Thousands)				
1985	12,000	4700	2900	27,900
1986	11,000	4200	2700	27,000
1985	$410,000	$160,883	$99,083	$953,250
Based on average annual price received by farmer:				.41/dozen
1986	$413,416	$157,850	$101,475	$1,041,058
Based on average annual price received by farmer:				.451/dozen

Source: Minnesota and United States Department of Agriculture. 1987. Information compiled from pages 58-78.

Alternative land uses

In addition to the production of farm commodities, alternative uses for agricultural land can be explored. At the present time, tree farms have not been developed to their full potential in eastern Pope County. The possibility exists for further growth in the area of Christmas tree, pulp, and timber production throughout the county.

Pasture land in Pope County could be better utilized for beef and sheep production than it is currently. The efficiency of pasture utilization is directly correlated to trends in dairy and beef production, both of which have declined over the past few years (USDA, 1987).

The USDA Conservation Reserve Program (CRP) is a popular program in Pope County. In 1987, 26,000 acres of land, or 37% of the eligible land in Pope County is in the CRP program. Of the county's total cropland, 70,000 acres, or 25% of this total, is the maximum amount of cropland that is eligible for this program. In order for land to qualify under the program it must be highly erodible cropland. Farmers are paid $47/acre/year for the ten years that their fields are enrolled in the program. Because irrigation in Pope County has become increasingly expensive, i.e. 12-15 inches/acre/season or $50-80/acre, some farmers who depend on irrigation are enrolling in the CRP program. Other farmers enrolled in CRP are those interested in re-establishing wildlife habitat, as well as those who need the monthly government payments in order to make ends meet (Pope County Soil and Water District, 1987).

Reinvest In Minnesota (RIM) is a popular state government program also designed to retire marginal and erodible cropland through 10 year, or permanent easements. Factors taken into consideration when determining which acres will qualify for the program are erodibility, wildlife potential, and pollution control. Direct payments are made to landowners, $30/acre/year for 10 year easements and 70% of the land value for permanent easements. In Pope County there are a total of 438.6 acres enrolled in RIM. Of these acres, 313.2 are in permanent easements and the remainder are in 10 year easements. Of the 438.6 total acres enrolled in the program, 162 acres are in tree plantings and 276.6 were seeded to native grasses (Pope County Soil and Water District, 1987).

Conservation practices

According to the Pope Soil and Water Conservation District conservation trends are moving towards conservation tillage methods. Farmers are using ridge till systems on corn, row beans, and sunflower acreage and the no-till system on small grains and solid seeded soybeans. Current research has shown that machinery fuel and labor have been substantially reduced using these conservation tillage methods but more importantly, soil erosion has been greatly reduced. Although some terraces exist in the county to control soil erosion, they are not popular because large machinery has problems maneuvering between the terraces.

Irrigation agriculture

Historical background

Pope County's irrigated land falls in what is popularly known as the Bonanza Valley. Fields which before irrigation where "burned up" during July and August due to the low water holding capacity of the course textured soil and limited rainfall, now boast about 120 bushels per acre of corn, and abundant yields of snapbeans, potatoes, cucumbers, dry beans, and soybeans. The transition from "dry land" to "irrigation" farming in Pope County has been gradual, with irrigated acres increasing from 2000 acres in 1965 to approximately 35,000 acres in 1987. Surveys have shown that up to 65,000 acres can be put into irrigation farming in Pope County (Morris, 1987).

The shift was a cooperative effort between farmers, community and area leaders, industry representatives, government agencies, and the state legislature. It began with the hard work and enthusiasm of farmers who wanted to improve their farm income. Community, business, and area leaders pitched in to help check the decline in farming in the area. Government agencies also offered their assistance. For example, West Minnesota Resource Conservation and Development (RC & D) provided technical service planning assistance, United States Geological Survey (USGS) conducted the ground water study, Minnesota Department of Natural Resources helped with the ground water study and water permits, and the Soil Conservation Service (SCS) offered soils interpretation and system-planning design. The Farmers's Home Administration (FHA) provided loans; the Agricultural Research Service (ARS) furnished research information; the Agricultural Stabilization and Conservation Service (ASCS) gave program assistance; the Small Business Administration (SBA) provided developmental loans; the Soil and Water Conservation District provided technical assistance; and the University of Minnesota Agricultural Experiment Station and Agricultural Extension Service offered information and education programs.

Real potential for irrigation in this area was not known until 1968 after completion of a two year ground water survey study by the United States Geological Survey. This survey came about through a plan for the economic development of the area. The purpose of the study was to estimate the amount and quality of water available for irrigation based on precipitation probability. The results of the survey confirmed that there was adequate, high quality water at shallow depths beneath much of the area.

Soils

Most of the soils in the Bonanza Valley area are formed in outwash. These soils are predominantly droughty and marginal for agricultural use without irrigation. As seen on Map 12, the predominant soils are the Estherville loam. It has a loam surface and subsoil that is underlain by limy gravel and sand at 12-18 inches. The organic matter content is

medium. The available water holding capacity is low above 3 inches in the depth to be irrigated. The permeability is moderate (0.6 - 2.0 inches/hour) in both the surface and subsoil layers and rapid in the gravelly substructure. The soil PH is neutral to slightly acidic.

Precipitation and temperature

Pope County has about 2,400 growing degree days (calculated from a base temperature of 50 degrees F). The warm period is reported as extending from about May to October 30th (Table 34).

Table 34. Precipitation in Bonanza Valley

Month	Av. Monthly Total Inches	Precipitation 1 Year in 10 Years Will Have Less Than Inches	Precipitation 1 Year in 10 Years Will Have More Than Inches
January	0.6	0.1	1.0
February	0.7	0.1	1.2
March	1.1	0.3	2.0
April	2.1	0.6	3.9
May	3.0	1.2	5.5
June	3.9	1.9	6.5
July	3.2	1.2	5.9
August	3.0	1.4	5.5
September	1.9	0.7	3.7
October	1.5	0.1	2.8
November	1.0	0.1	2.1
December	0.6	0.1	1.1
Year	22.6	17.4	26.1

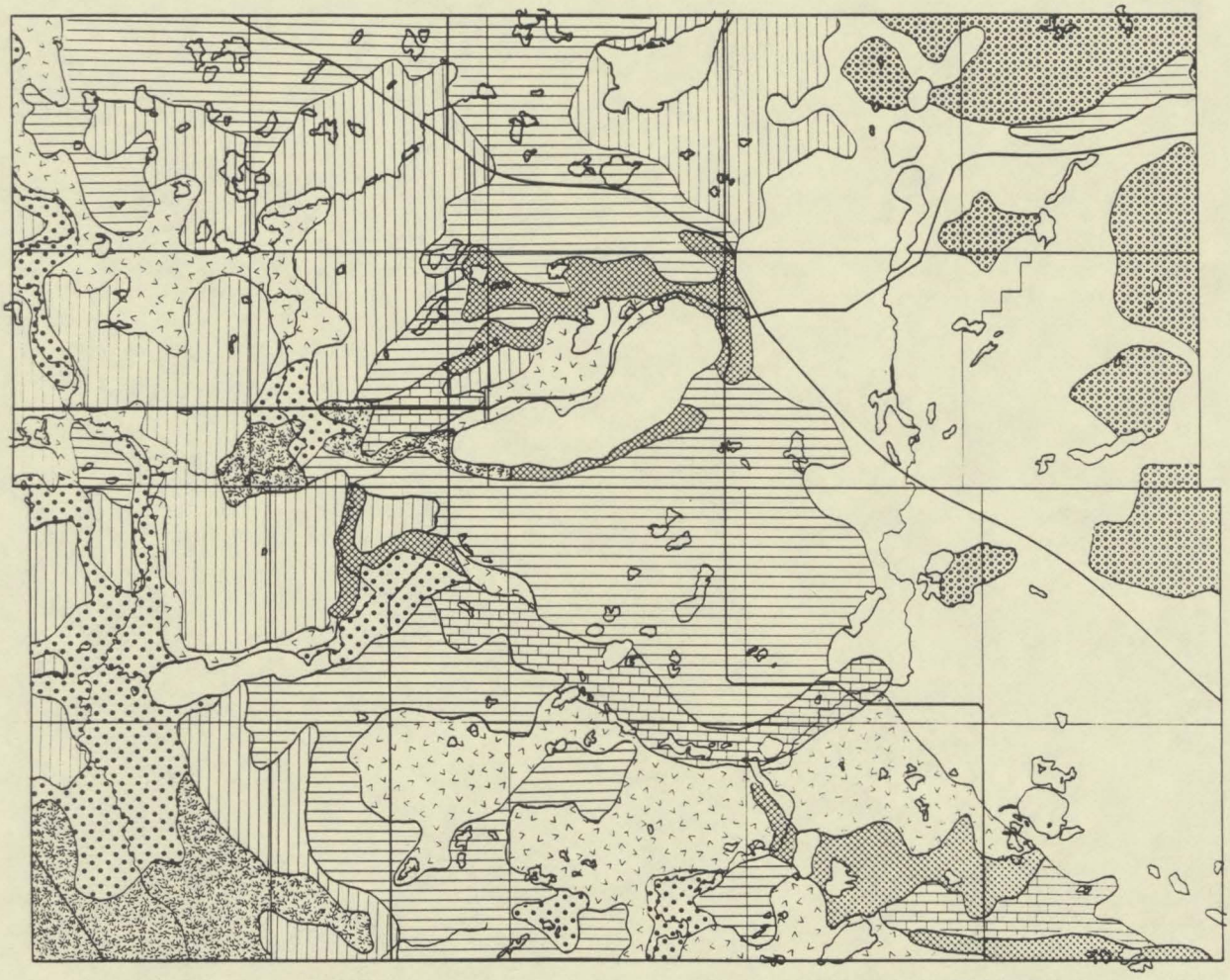
Source: Ross, Lyle M. An Evaluation of Irrigation Potential in the Bonanza Valley, 1971. Page 3.

Over 13 inches of the 22.6 inches average annual precipitation occurs during May, June, July, and August. Potential evapotranspiration averages about 3 inches in excess of precipitation during July and August.

Lake Emily area has suitable combination of water supply and soil types for irrigation farming. Sixty percent of this area has varying amounts of underground water available and the soil is suitable for irrigation. However, the yield of an individual well limits the amount of acreage that can be irrigated (see Table 35).

Map 12.

GENERAL SOIL MAP



POPE COUNTY
MINNESOTA

N

0 2 4 6

Miles

RCD 1988
UNIVERSITY OF MINNESOTA

SOIL ASSOCIATIONS

- Barnes-Langhei-Doland
- Barnes-Langhei-Svea
- Langhei-Barnes
- Langhei-Barnes-Waukon-Sioux
- Sioux-Maddock
- Clarion-Canisteo-Nicollet
- Estherville-Muck
- Renshaw-Estelline
- Marysland-Muck-Arevson

Source: USDA Soil Conservation Service. 1979. Pope County Soil Survey.

Table 35. Acres That Can Be Irrigated With Various Amounts of Time and Capacity Wells.

Hrs. of Pumping Time Per Day	Required Gallons Per Min. Per Acre	Total Acres That Can Be Irrigated With Wells As: 100 gpm*	200 gpm	300 gpm	600 gpm	900 gpm
12	12.6	8.00	16	24	48	72
18	8.4	12.00	24	36	72	108
20	7.6	13.00	26	40	79	120
22	6.9	14.5	29	44	87	130
24	6.3	16.0	32	48	96	144

gpm = gallons per minute

Source: Ross, Lyle M. An Evaluation of Irrigation Potential in the Bonanza Valley, 1971. Page 7.

Trends

In 1965, 2000-3000 acres of land were under irrigation. In 1974, 10,975 acres were under irrigation. In 1983, 34,100 acres were under irrigation. In 1987, 35,000 (est.) acres were under irrigation. These figures show that irrigation farming in Pope County has been increasing. As pointed out earlier in this section, farmers in this area invested in irrigation farming because they wanted to improve their incomes. Studies done in the area over years of irrigation farming showed that the economy of this area improved greatly. In 1969, farmers interviewed by the Farmer Magazine had very positive responses. Jim Jacobs, a dairyman, who owned 320 acres of land, had increased his herd size because his feed supply had significantly increased. With a three-tow line system Jim could also irrigate 100 acres of corn and alfalfa. Corn was yielding 160 bushels per acre, while snapbeans yielded up to 7000 pounds per acre (Minnichsoffer, 1969).

Crops

Irrigation has expanded the choice of crops grown in the area. Crops grown include potatoes, snapbeans, and soybeans produced for commercial markets, corn and alfalfa grown for livestock feed. Corn and alfalfa were the first crops to be chosen by farmers in this area because farmers were familiar with them; farmers had machinery needed for producing them and they had market outlets in the area, particularly for corn. Alfalfa was used as forage for local dairy and beef cattle enterprises. A few canning crops are grown under contract for selected markets, e.g., potatoes. There are six elevators for crop storage in the county. They are located at Starbuck Creamery Elevator, Cyrus Elevator,

Glenwood-Cyrus Elevator, Harvest States Elevator, Lowry-Villard Elevator, and Brooten Farmers Elevator.

The farm crisis has resulted in the disappearance of some agricultural service industries such as the Glenwood Fertilizer Plant and Starbuck Implement Company. Also, Welte Enterprises in Brooten, a manufacturer of irrigation systems, has been declining in business and has diversified into other areas.

The irrigated crop acreage has increased steadily as can be seen in Table 36 below.

Table 36. 1977 Irrigated Crops

	1977 (acres)	1985 (acres)
Field corn	14,330	15,938
Sweet corn	2,700	--
Potatoes	785	1,712
Alfalfa	818	1,320
Soybeans	494	4,687
Small grains	365	I,841
Sunflowers	80	--
Sod	120	--
Dry beans	75	--
Canning	--	277
Specialty	--	310

Source: Ross, Lyle M. An Evaluation on Irrigation Potential in the Bonanza Valley, 1971. Page 9.

The trend of land irrigated in the county has been on the rise as shown in Table 37.

Table 37. Irrigated Land

1966	2,000
1970	27,775
1974	10,975
1978	23,320
1982	32,100
1982	34,100
1987	35,000 (est)

Source: University of MN West Central Experiment Station, Morris. 1984. "Summary of Irrigated Acreages for Selected Counties in West Central MN."

Table 38 below shows sprinkler irrigated land by township in the county.

Table 38. 1977 Sprinkler Irrigated Acreage - Pope County

Township	Acres
Bangor	3,100
Barness	0
Ben Wade	0
Blue Mounds	80
Chippewa Falls	750
Gilchrist	325
Glenwood-East	3,975
Glenwood-West	0
Grove Lake	1,500
Hoff	1,470
Lake Johanna	2,715
Langhei	0
Leven	415
Minnewaska	0
New Prairie	120
Nora	0
Reno	0
Rolling Forks	80
Walden	3,487
West Port	1,385
White Bear Lake	365

Source: University of MN Area Extension Office-Irrigation. "1977 Sprinkler Irrigation Acreage. Pope County, MN."

Due to a decline in prices received for widely grown crops such as corn, soybeans, and small grains, farmers are becoming more interested in alternative or specialty crops. In this county, specialty crops such as sweet corn, navy beans, pinto beans, snapbeans, cucumbers, red beets, adzuki beans, sweet corn seed, raspberries, and strawberries have been grown but on a very small scale. Farmers can't produce too much of these specialized crops because of lack of market. Marketing fruits and vegetables involves more than simply hauling the crop to the scales. Most processing plants for fruits and vegetables (perishables) are located outside the county, i.e., market for navy beans is in southern Minnesota, market for beets and cucumbers is in Chaska; for navy beans there are processing plants at LeSueur and Olivia. In this view, then, the distance to market is the obstacle blocking increased production of these specialty crops. Competition with other large farmers outside Pope County is also a factor that must be faced. And finally, some specialty crops are more costly to grow than the normally grown crops; seed, fertilizer, specialized equipment,and higher management skills needed may not be worth the hassle considering the market problem. A marketing association may need to be developed if these crops are to be successfully encouraged.

Onions, carrots, barley, and sorghum could also grow in this area as studies have shown them to be grown elsewhere in areas with similar conditions.

Various types of sprinkler irrigation systems currently practiced in Pope County are the center pivot, tow gun, and tow line. The center pivot is the most used, followed by the tow gun and then tow line, as shown in Table 39.

Table 39. Irrigation systems used in Pope County

Survey Date	Total Acres	Center Pivot	Tow Gun	Tow Line	Other
Dec. 77	19,767	17,162	1,590	940	75
June 77	32,678		DNR Water Permit Acres		
June 76	18,765	13,385	3,560	940	880
June 76	22,146		DNR Water Permit Acres		
May 75	10,975	7,700	820	965	1,490
May 74	7,680	5,135	710	725	1,110
April 73	5,130	3,085	500	825	720
April 72	4,305	2,440	420	765	680
June 71	2,775	1,170	300	490	815

Source: University of MN Area Extension Office-Irrigation. "1977 Sprinkler Irrigation Acreage. Pope County, MN."

Equipment selection by farmers is based on several factors: roughness of topography, soil texture, crop height, peak water use rate of the crop, available water supply, and the area to be irrigated.

Currently, demand for irrigation has slowed down because of the poor economy. Future growth will be determined by the economy's profitability, i.e., when corn prices go up, this may be an incentive to increase investment in irrigation. Pope County has potential irrigable land of 65,000 acres. Jack Morris, the County Agricultural Extension Agent, emphasized that most of the good land is already under use and the remaining is marginal land, which may not be profitable for irrigation investment. Regarding markets, he said that they were considering setting up a vegetable processing plant in the county; though the cost is high and may not pay off, he was of the opinion that the answer to agricultural profitability in this county may not rest so much in "new crops" as in "new uses" for old crops (Morris,1987).

Environmental problems related to agriculture

Environmental problems related to agriculture exist in the areas of pesticide, fertilizer, and feedlot runoff or leaching. The district feedlot survey made in 1978 showed 303 feedlots with pollution potential.

Some have now been discontinued and approximately 25 have installed ag-waste management systems (Morris,1987). Leaching of pesticides and fertilizers and its affects on water quality is being studied at the Rosholt Research Farm. The data from this farm is being used to educate farmers on proper management of these agriculture inputs, especially on sandy soils.

REGULATIONS
and
ASSISTANCE

VI. REGULATIONS AND ASSISTANCE

There are many regulations and government assistance programs that can aid and affect Pope County in its decisions for the future. The following section explains some of these programs.

Water development regulations

Minnesota's image is the land of 10,000 lakes. So it follows that it has a history of water-related development. Appreciation of water values and public recognition is evident in the laws established to protect these waters. Since 1937, Minnesota law has protected and maintained the rights of the public to use and enjoy, as well as to conserve water resources in the state.

For the purpose of regulation, Minnesota (under the Minnesota Department of Natural Resource's authority) has grouped waters into two categories. One of these categories is called "protected waters" and the other is "wetlands."

These regulations encourage the wise use of many types of water basins and watercourses. Protected waters and wetlands are identified based on size, physical characteristics, and ownership of surrounding lands. The DNR states that any organization, person, or agency proposing to change the course, current, or cross-section of protected waters or wetlands must obtain a permit from the Minnesota Department of Natural Resources. Further information and authority for this permit can be found in the Minnesota Statutes, Chapter 105. Maps of these protected waters and wetlands are available at the DNR Offices, County Auditor offices, and County Zoning offices. These waters were identified to make it easier for the state DNR to determine all waters within the state where a permit is required. These waters are found on both private and public lands.

The State of Minnesota regulates protected waters and wetlands for many reasons. One of these reasons is that these waters provide important habitat for fish and wildlife, as well as places for people to fish, hunt, trap, boat, swim, and for other recreational activities. Most importantly, these waters hold large amounts of water which can seep into the ground and recharge our underground waters. Most cities and rural communities rely on these waters for their drinking water.

So what are protected waters and wetlands? The DNR explains these waters in nine steps, and includes all of the following situations (MnDNR, " Minnesota's Protected Waters and Wetlands," 1987).

1. All water basins assigned a shoreland classification, except wetlands less than 80 acres, are classified as natural environment lakes. Check the local county zoning official to determine whether this applies to specific lakes.

2. All lakes which have been determined to be public waters or navigable by court of law.

3. All meandered lakes.

4. All water basins previously designated by the Commissioner of Natural Resources for a specific management purpose.

5. All water basins previously designated as scientific and natural areas.

6. All water basins located within or totally surrounded by publicly owned lands.

7. All water basins where the State of Minnesota or the federal government holds the title to any bed or shores.

8. All waters where there is a publicly-owned and controlled access.

9. All natural and altered natural watercourses with a total drainage area greater than two square miles and those designated by the Commissioner of Natural Resources as trout streams, regardless of the size of their drainage area.

Wetlands are described in three categories and are regulated and protected under Minnesota law. These three groups are defined as follows: 1) "waters which have not been designated as protected waters," 2) "are 10 or more acres in size in unincorporated areas," 3) "2 1\2 or more acres in size in incorporated areas" (MnDNR, "Minnesota's Protected Waters and Wetlands," 1987).

There are also three categories of wetlands: One of the three categories of wetlands is inland shallow marshes. In this type of marsh the soil is usually covered with as much as six inches of water and/or is waterlogged during the growing season. The area has vegetation such as bulrushes, cattails, and smartweeds.

A second category is inland deep fresh marshes. This area has even more water covering the soil, with six inches to three feet or more during the growing season. Vegetation includes pondweeds, naiads, and coontails.

The third group in the protected category is the inland open fresh water. In this type of marsh there is usually less than ten feet of water which contains the same vegetation types as the inland deep marshes.

The boundary of protected waters and wetlands is defined by the "ordinary high water mark" (OHW). The OHW is the elevation delineating the highest water level which has been maintained for a sufficient period

of time to leave evidence upon the landscape. Any work done below the OHM is subject to the permit authority of the DNR. The DNR suggests that before any work is done that a local Conservation Officer must be contacted. If a proper permit is not obtained and is required, it is a violation constituting a misdemeanor and is punishable by imposition of fines up to $700 and/or 90 days in jail (MnDNR, Minnesota's Protected Waters and Wetlands," 1987).

There are many agencies which regulate what is done on lakeshore land and within waterways. Before a project can be implemented, all the agencies which have jurisdiction rights must approve the project or it can not be completed.

Other state agencies also regulate shoreland areas. The MnDNR policy states that uncontrolled use of shorelands adversely affects the public health, safety, and general welfare by contributing to pollution of public waters and by impairing the local tax base (MnDNR, "Minnesota State Regulations and Rules." 1987). This agency sets criteria for development of shorelands which include regulations governing sanitary waste facilities, placement of structures and roads, alterations of natural landscapes, and subdivision of shoreland areas.

The DNR also regulates state recreation trails. The rules and regulations provide for public use and protects the quality of the trail environment. Trails are also subject to other laws such as the Commissioner's orders, snowmobile rules and regulations, and bicycle rules and regulations (MnDNR, Procedures for Issuing Easements, 1987).

In Pope County, several regulations control development. Ordinance #1 deals with shoreland management and covers such topics as: shoreland boundaries, sanitation standards, well water supply standards, building permits, mobile home restrictions, steel buildings, pole buildings, shoreland alterations, waste disposal, subdivision regulations, and licensing. The boundaries of the shoreland management ordinance are established at "1000 feet from the normal high water mark of a lake pond or flowage and 500 feet from a river or stream or landward extent of a flood plain designated by ordinance of all public waters in Pope County" (MnDNR, State Regulations and Rules).

This ordinance also discusses requirements for minimum open spaces, mobile home parks, historic sites, and recreational camping areas. This type of information might be important concerning the area of tourism.

Ordinance #2 deals with subdivision controls. Ordinance #4 is about solid waste disposal, and the control of waste facility operation. The last ordinance covered, ordinance #5, deals with flood plain management. The purpose of this ordinance is to maintain the county's eligibility in the National Flood Program and to minimize potential losses due to periodic flooding. These ordinances do not pertain to tourism development as much as ordinance #1.

Easements

Obtaining easements can be important in the development of trails and roads that cross state owned land. Without an easement, a planned trail system could not be linked. Information on the procedures for issuing road and trail easements through the DNR can be found in the Minnesota Statutes 84.63 and 84.631. In this information the authorization of easements is discussed. Easements are issued for the purpose of establishing roads or trails across lands administered by the DNR. There are also road easements across trails established on acquired railroad right-of-ways.

To obtain an easement, first, an agency must submit the proper papers requesting an easement to the St. Paul office of the Minnesota Bureau of Land. Within the Bureau of Land, it is reviewed by the Regional Land Specialist at the DNR. This specialist will then submit all the proper forms and make recommendations to the Bureau of Land. It is then approved or disapproved.

Grants and their availability

The Minnesota Department of Trade and Economic Development provides money through the Land and Water Conservation Fund (LAWCON) and the Legislative Commission of Minnesota Resources Fund (LCMR). These programs provide funds for up to 50% of the purchase and/or development costs of local parks to units of government such as cities, counties, townships, and special park districts. Some projects that are high on the eligible list for funding are various types of trails (snowmobile trails are not eligible), boat accesses, fishing piers, swimming beaches, and campgrounds. An application form is required for the funding. The application can also be used to select the best proposed areas for development to help ensure the highest possible consideration to receive funds.

Grants and loans

There are a number of grants and loans available for rural economic and natural resource development in Minnesota. A complete listing of programs is too large to publish here, however the following list is provided to assist in preliminary investigation.

Rural economic development

McKnight Foundation West Central Initiative Fund
West Central Region
Fergus Falls, MN

Contact Person: Chris Gilchrist
(218) 739-2239

The McKnight Foundation has a regranting process that takes place throughout the state of Minnesota. Each region has its own board of directors that determines guidelines for funding of rural economic development.

The MN Rural Development Act of 1987

The Challenge Grant Program:

This program provides a means of getting low interest loans to new and expanding rural businesses which will employ low-income persons.

Rural Rehabilitation Pilot Project Program:

This is a grant-giving program which can award up to $500,000 in grants to support farm-related rural development pilot projects that are designed principally to benefit low-income people.

Contact Person: Jerry Schoenfeld, Director
MN Trade and Economic Development
Community Development Division
900 American Center Building
150 E. Kellogg Boulevard
St. Paul, MN 55101-1421
(612) 296-9090

The Greater Minnesota Corporation

This corporation was created by the legislature to promote jobs and economic growth throughout Minnesota (with an emphasis on the rural areas) through investment in applied research, product development, and technological innovation.

Contact Location: Greater MN Corporation
International Center
900 2nd Ave South
Suite 440
Minneapolis, MN 55402
(612) 347-9292

Northwest Area Foundation

The Northwest Area Foundation is interested in macro-economic issues, capital and finance, community revitalization, small business development, new strategies for economic development in rural areas, and rural infrastructure.

Contact Location: Northwest Area Foundation
975 First National Bank Building
St. Paul, MN 55101-1373
(612) 224-9635

U.S. Department of Housing and Urban Development

Urban Development Action Grant Program:

This program provides grants to cities which in turn loan to local businesses with payback of the loan to the city. These grants are used to help finance projects which are successful in attracting private investment for commercial, residential, and industrial development.

Contact Location: U.S. Dept. of Housing and Urban Dev.
220 Second Street South
Minneapolis, MN 55401
(612) 349-3026

Minnesota Department of Trade and Economic Development

The Agricultural Resource Loan Guaranty Program:

This program is designed to provide loan guaranties for the development of agri-processing facilities in order to further the development of the state's agricultural resources and improve the market for its agricultural products.

Projects eligible under the program are any facility located in the state which is to be operated primarily for the production from agricultural resources of marketable products, including substances for use as a fuel or substitute for petroleum.

Contact: (612) 296-7457

Opportunities Minnesota Incorporated (OMNI)

This program provides subordinated financing through the issuance of debentures for businesses that are purchasing buildings or capital assets with useful lives greater than 15 years.

The program provides financing for fixed assets, including:

Land acquisition
Building construction
Leasehold improvements
Renovation and modernization
Machinery and equipment

Contact: (612) 296-0582

Minnesota Public Facilities Authority

This provides loans and grants to qualified governmental units from funding programs administered by the Authority for the acquisition and betterment of public lands, buildings, facilities and improvements of a capital nature.

To improve the infrastructure within a given area, to encourage economic development, or serve to improve or maintain the public health of the citizens in the state, the following funds are available:

*The Municipal Energy Conservation Investment Loan Program
*District Heat and Qualified Energy Improvement Loan Program
*Health Care Equipment Loan Program
*Minnesota Water Pollution Control Fund

Contact: (612) 297-1170

Natural resource development

The Minnesota Native Prairie Tax Credit Program

This program was authorized by the Minnesota legislature in 1980 and is administered by the Natural Heritage Program in cooperation with the Department of Revenue. It works by exempting approved native prairie land from property taxes.

Contact Location: Natural Heritage Program
Department of Natural Resources
Box 11, Centennial Office Building
St. Paul, MN 55155

Northwest Area Foundation

The foundation will support efforts to analyze the critical public policy issues that shape the region's agricultural economy, explore alternative growing and marketing systems that balance environmental concerns with profit, develop new processing models that increase the economic viability of small-scale producers, and train leaders concerned with natural resource policy. The Foundation is also interested in efforts to address water quality and management, preservation of ecosystems, land management, disposal of hazardous wastes, and air quality.

Contact Location: See above under Rural Economic Development

A list of Travel and Tourism Resources is included so that additional information can be obtained if so desired.

Tourism USA: Guidelines for Tourism Development 1986. University of Missouri, Dept. of Recreation and Park Administration, University Extension. Prepared for the U.S. Dept. of Commerce. 227pp.

Excellent "how to" handbook with sections on 1) appraising tourism potential, 2) planning for tourism, 3) assessing product and market,

4) marketing tourism, 5) visitor services, 6) sources of assistance. Single copies are available for $3.00.

Contact Location: U.S. Dept. of Commerce
14th & Constitution, Room 1865
Washington, D.C. 20030,
(202) 377-0140.

Managing Small Resorts for Profit. 1985. Minnesota Extension Service, University of Minnesota. 205pp.

Contains a marketing section with articles on market planning process, brochure development, advertising, positioning, and package tours. Available for $20.00.

Contact Location: Bud Crewdson, Small Business Development Center
Minnesota Extension Service
248 Classroom Office Building
University of Minnesota,
St. Paul, MN 55108,
(612) 625-3157.

For information on joint venture marketing program, contact the Minnesota Office of Tourism. Some marketing activities may be eligible for matching funds allocated on a competitive basis to local, regional, or statewide nonprofit organizations formed to promote tourism.

Contact Location: Minnesota Office of Tourism
250 Skyway level
375 Jackson Street
St. Paul, MN 55101
(800) 652-9747, (612) 296-5029.

The University of Minnesota Tourism Center offers educational programs and materials for the visitor, industry and community tourism development, and small business management.

"So Your Community Wants Tourism: Guidelines for Developing Income from Tourism in Your Community" CD-FO-0679)

"Creating a Tourism Promotional Theme" (Available 1988)

"Tourism Advertising: Some Basics" (CD-FO-3311)

"Cost Comparison Methods to Evaluate Your Tourism Advertizing Campaign" (CD-FO-3372)

"Tourism Brochures to Boost Business" (CD-FO-3273)

Contact Location: Tourism Center, Minnesota Extension Service,
University of Minnesota,
240 Coffey Hall
1420 Eckles Avenue,
St. Paul MN 55108.

The Minnesota Department of Trade and Economic Development administers four programs that give residents an opportunity to develop expertise in identifying and using community resources: the Minnesota Community Improvement Program, the Governor's Design Team, Minnesota Main Street, and Minnesota Beautiful. Program coordinators can be reached at the Department of Trade and Economic Development.

Contact Location: 900 American Center Building,
150 East Kellogg Blvd.
St. Paul, MN 55101.
(612) 297-3190.

VII. CONCLUSION

Potential directions the people of Pope County can take to enhance tourism and agriculture have been outlined in this report. Maintaining and improving the quality of life in Pope County requires an integrated approach to preparing for the future. Guidance on how to look at the quality of the county in a holistic way can be gained from the ideas presented by Joan Nassauer in the report Caring for the Countryside published by the Soil Conservation Service and the University of Minnesota Agricultural Experiment Station (1986). The author's concepts, and how they relate to Pope County, are offered below.

Each place has its own unique qualities. Pope County is no different. The rural landscape is a reflection of the natural variations that occur in geomorphology, climate, and plant and animal life. To make these more apparent, the rural landscape should retain its fundamental openness, naturalness, productivity, and orderliness.

According to Nassauer, "Some landscapes project a functional image. Knowing that the local landscape may be more functional than picturesque, or may have its own character different from either type, helps to build on what is currently present. A functional landscape "beautified" to imitate the picturesque will obscure the real beauty of the locale." Change can maintain and even further reveal the particular character of Pope County.

Development that violates fundamental qualities of the rural Pope County landscape or obscures its local character will look "out of place." "A scenic landscape displays one broad land use pattern; the landscape has unity of meaning and of form. Variety and emphasis can reinforce the overall pattern" states Nassauer. Landscape change should grow from an understanding of the unified pattern and elements of variety and emphasis in Pope County.

Three guiding principles that Nassauer points out as being important for maintaining an attractive countryside can very well apply to Pope County and be a part of thinking about the future.

1. Respect the particular characteristics of the local. Reinforce the present landscape qualities of the region.

2. Maintain the meaning of the Pope County countryside; wholesome and rural-based. Look for those qualities that distinguish countryside from the urban areas keeping them distinct and different. Preserve a sense of openness, naturalness, productivity, and orderliness.

3. Look at the basic visual relationships among landscape elements. Begin by identifying the unified pattern of elements in the locale. The new elements should fit into the Pope County landscape features or enhance it by adding variety.

APPENDICES

APPENDIX A

Public Land Survey Locations of the areas identified on the map "Original Plant and Animal Communities".

Colonial Waterbird Nesting Sites

T126N, R38W, sections 10 and 11. Lake Reno.
T123N, R36W, section 17. Lake Johanna Township.
T126N, R37W, sections 23, 26, and 35. Lake Amelia.
T123N, R38W, sections 10, 15, and 16. Pelican Lake.

Conifer Swamps

T125N, R36W, sections 5, 7, and 8.
T123N, R38W, section 23. Mud Creek Tamarack Swamp.

Glacial Till Hill Prairie

T123N, R36W, section 21.
T123N, R36W, section 30. Ordway Prairie.

Gravel Prairie

T124N, R38W, W, SW, section 28.
T124N, R38W, NW, section 28.
T124N, R38W, E, SW, section 19, and, SE, section 19.
T124N, R39W, section 24. Glacial Lakes State Park.

Mesic Blacksoil Prairie

T126N, R38W, S, NE, section 35. Reed Farm Prairie.
T125N, R38W, NW, NW, section 6. Strandness Prairie.

Information obtained from, (MnDNR, MNHP 1987)

APPENDIX B

Retirement Potentials in Grand Rapids

The city of Grand Rapids received a grant from the Blandin Foundation to study the potential of the Grand Rapids area to attract persons over the age of 50 to their community. The first phase of the study has been printed in the report, A Market Study For Potential of Attracting Retirees to Grand Rapids Area, Phase I (James B. McComb & Associates and Mid-Continent Research, Inc., 1986). The report has been summarized below for Pope County to use in determining if it wishes to develop a retirement community.

There are three phases to the study. Phase I research included: a telephone survey of retired persons who relocated to Grand Rapids during the past five years, migration patterns to Itasca County, review of demographic growth trends for retirees throughout Minnesota, and an analysis of existing services and local attitudes toward increasing the number of retired persons in the area. Phase II will quantify the potential of the retiree market through an extensive telephone survey and a study of strategies that have worked for other retirement areas. Further study will be given to the economic and community service ramifications of an increased retiree population. James B. McComb & Associates and Mid-Continent Research will be responsible for Phase II of the research. A test marketing program will be conducted in Phase III to determine effective strategies for attracting retirees. Only the findings of Phase I are summarized, as Phase II and III are not available.

In Minnesota, the population between 50 to 74 is forecast to increase by 20 percent from the year 1980 to 2000, and 32 percent from the year 2000 to 2010. This increase in the older population will increase the need for more retirement communities. When considering a retirement location, climate, the cost of living, availability of housing, medical services, recreation, cultural activities, and social services were all considered important factors in choosing the location. Three criteria which seem to be most important are: proximity to family or relatives, opportunities for a stimulating lifestyle, and availability of services.

There has been an increase in unearned incomes locally and nationally. Unearned incomes are defined as those incomes drawn from transfer payments, investments, or other sources not related to employment. Attracting persons whose incomes are largely derived from transfer payments is an excellent way to stimulate an economy.

Several attempts have been made to measure the impact of consumer spending on the local economy. University of Missouri economist, Floyd Harrison found that every $1.00 spent locally by retirees in Vandalia, Missouri generated an additional $1.22 of local income and business revenue. A University of Wisconsin-Madison study showed that one new job

results from each $4,425 of transfer income. "Retirement and related programs make up two-thirds of the transfer payments," reports Summer and Hirschl (1985). Retirement incomes are more effective and efficient in creating jobs than traditional industries, according to researchers. This is because the elderly have greater proportions of untaxed income and tend to spend it locally.

Though sometimes overlooked, the retiree population represents a large proportion of consumer demand. A Conference Board and Consumer Research Center study determined that households headed by persons age 50 and over, generated 42 percent of all consumer demand for goods and services (The Conference Board and Consumer Research Center, 1985.) The same study also found that couples in the age 65 and over category had an average household income of $21,000 in 1983. Compared to the average household income of $17,500 (in 1983 dollars) earned by these same couples in 1950. They now have more than 20 percent higher incomes. Seniors often have less income tax burdens so they may have more income available for spending on goods and services.

A survey of seniors conducted by the Headwaters Regional Development Commission in northern Minnesota found that seniors would often spend more money if it was convenient for them to do so. The commission's survey of 925 seniors in the region indicated the following:

-Forty-three percent of the seniors said unavailability of transportation was their major reason for not making needed trips for goods of services.

-Twenty-eight percent of the seniors said they were not aware of transportation services upon which they could call.

-Forty percent of the seniors did not have adequate knowledge of financial services they needed.

Service delivery is a major need of seniors. Their potential for spending could be more fully realized if programs and services were made available and publicized.

A survey of 39 people who were over 50 years old who had recently moved to Grand Rapids were interviewed as to why they those the location, and their satisfaction with the area. Half of those interviewed were from Minnesota and half were from out of state. The interview was conducted with local resource persons in Grand Rapids.

The common denominator among those surveyed was that all these retirees had previous contact with the area. Fifty-nine percent had family in the area, sixty-seven percent vacationed there, and thirty-eight percent owned vacation property. The advantages of relocating in Grand Rapids were: living in a small town, clean environment, sports and recreation opportunities, living near friends and family, and the beauty of the area.

The conclusion of the report was that the Grand Rapids-Itasca area had a good potential to attract retirees to the area. A significant number of retirees were already located in the area. Itasca County ranked ninth among all counties in the nation in attracting out-migrants from the Twin Cities. The stability of Grands Rapid's good financial condition and availability of sewer and water to undeveloped areas, made it a more desirable location for the retiree market.

APPENDIX C

A Survey of Potential New Corn Uses

Listed below are fourteen alternative uses for corn. This information was obtained from the report A SURVEY OF POTENTIAL NEW CORN USES (Kelly Harrison Associates, Inc. 1986).

Corn can theoretically be used as a feedstock to produce most products currently derived from petroleum and other fossil fuels. It has the long-term advantage of being a renewable resource, but it must also be economically competitive with petroleum. The impressive recent success of ethanol made from corn establishes a precedent.

One must recognize that the process of identifying, developing, and marketing a new product is long and demanding. Seldom can a new product be taken through the development stages in less than 5 years, most require 10 to 20 years and millions of dollars. New product development and market introduction is a long , arduous, and expensive process. While it is important for corn growers to understand this, they should not be intimidated.

Highway de-icer

For a number of years, highway researchers have been looking for a de-icer to replace salt, which is highly corrosive and environmentally deleterious. An alternative which has been considered is calcium magnesium acetate (CMA). In 1982 the Federal Highway Administration initiated a program to evaluate CMA as an alternative de-icer. The report "Public Roads," published in March, 1984, summaries the preliminary findings.

Using the price of $2.80 a bushel for corn, CMA would cost 18-19 cents per pound or about 7-8 times the cost of road salt. The study indicates that CMA has little deleterious effect on plants and animals and is considerably less corrosive to metals and highway construction.

In de-icing tests, CMA performed as well as salt in eliminating ice and snow from roads and bridges. The initial high cost of using CMA is easily off set by lower social costs and reduced replacements cost for vehicles, bridges, roadways, and utility installations.

Coal de-sulfurization using ethanol

The coal industry has been greatly affected by the legislation of limits on allowable sulfur dioxide emissions. The sulfur emission limit is 1.2 pounds of sulfur dioxide per million BTU. Methods which remove sulfur during and after coal combustion have received considerable attention and funding.

"Carbon Monoxide-Methanol Desulfurization of High Sulfur Coal," is a pre-combustion process using carbon monoxide and ethanol. One advantage

to using this type of process is that in addition to yielding a low sulfur fuel, the by products are also commercially useful through the production of herbicides and other products.

The removal of organic sulfur from coal requires .028 pounds of ethanol per pound of coal (based on a coal with 1.8% organic sulfur). The production of one pound of ethanol requires .06 bushels of corn.

Methanol cetane enhancer using corn cobs

Recently there has been a interest in finding something cheap to replace diesel fuel. Methanol is now made from natural gas, and is slightly cheaper than conventional petroleum-based fuel. Pure methanol has several disadvantages. Costly engine modifications are required in order to achieve proper ignition temperature for the use of methanol in diesel engines. In addition, methanol tends to increase wear on engine parts due to its lack of lubricity and viscosity.

Dr. Gustav Schulz of the University of Pittsburgh Applied Research Center, found that a mixture of 79 percent methanol, 20 percent lignin-derived octane enhancer and 1 percent castor oil was able to start a test diesel engine. The lignin that was used was derived from corn cobs and found to have advantages over other feedstocks tested. About 65 percent of the lignin was directly soluble in methanol, and the remaining solids appear to be high quality cellulose. If the material is found to be high in alpha cellulose, the by product could be worth as much as $800 per ton.

The process using the lignin-derived enhancer, is extremely simple and straight forward. It may well lend itself to relatively small-scale, low-investment production facilities which have to be located near a source of corn cobs to minimize transportation costs. Some highly speculative assumptions give an indication of the possible economic implications for corn growers. If we assume that one billion gallons of methanol were blended with 200 million gallons of a centane enhancer derived from whole ground corn cobs (assuming a 65 percent methanol solubility of the material), a brand new market for 490 thousand tons of corn cobs could materialize.

Many technical questions remain to be answered. Approximate production costs estimate that the cetane enhancer might be produced for about half the cost of methanol, which has generally been competitive with diesel prices per BTU basis.

Fuel slurries from corn waste

Slurries of bituminous coal in water can give an acceptable performance in diesel engines except for the high abrasiveness of the ash components in the coal (using 10-20% diesel oil for pilot fuel). Three years of research at the University of North Dakota Energy Research

Center has shown that hydrothermally upgraded lignits slurries have equal or better combustion characteristics.

Preliminary estimates indicate that the potential biomass-water-ethanol slurry, should be producible at a cost comparable to, or lower than the diesel. Lignite slurry fuel could be produced for $1.40/Btu. This assumes that farm waste products, such as corn stalks, could be collected at the plant site for about $11.00/ton and used to produce slurry fuel of only 5,000 Btu/lb, with about the same density of water, resulting in a cost $.0595/gallon. Diesel fuel has about 19,000 Btu/gallon and presently sells for about $0.72/gallon for off-road use. It takes 3.9 gallons of such a slurry to replace each gallon of diesel at a cost of $0.23 per equivalent gallon of diesel.

The major attraction of this potential new product is that it would use substantial amounts of ethanol produced from corn to substitute for diesel fuel while providing, for the first time, a market for corn stalks.

Modified corn starch for wound treatment

Approximately three million Americans suffer from pressure ulcers. A low cost and effective treatment has never been available. Dr. Anthony N. Silvetti, a medical researcher in Chicago has been experimenting with the use of a modified corn starch in the treatment of bed sores and burns. Dr. Silvetti believes that the modified corn starch somehow assists the body in regenerating skin tissue. He has applied for product approval by the Food and Drug Administration. The final approval cannot be obtained until adequate evidence is presented to confirm the product's effectiveness.

Corn stillate as an adhesive/binder

The University of Nebraska has been testing a procedure using stillage from plants as a binder for producing composite board building material. In making composite board, wood chips are sprayed with a stillage treated with a chemical "initiator" onto wood chips.

Energy cubes provide a possible solution for the growing solid waste problem by using carbon from municipal solid waste to make fuel cubes to be used in gasification and a variety of boilers. Ethanol is used in one of the last steps in the process of making the energy cubes as an adhesive/binder.

Bio-degradable plastics from corn starch

The United States produces more than 30 billion pounds of plastics each year. At some point it must be disposed properly. The need for biodegradable plastics has intensified interest in natural products as an

alternative. Starch, especially from corn, is probably the most abundant and lowest cost natural polymer available. The Northern Regional Research Lab of the USDA has developed and patented, a process for producing a biodegradable plastic from corn starch. Further research and engineering is needed to determine the commercial feasibility of the process.

Grafting cellulosic polymers to synthetic plastic polymers

The blending of polymers can only be done with compatible materials. Cellulose and synthetic materials are not compatible and will not stick together.

A technique called, graft copolymerization using anionic polymerization, introduces a third polymer that is compatible with the other two and forms a stable bond. This process is planned to be used to graft polymerization of corn gluten feed (dried soluble by-product of wet-milling) with polystyrenes (e.g. styro-foam).

Whey/corn slurry as ethanol feedstock

Using whey to make ethanol cost 18 cents per gallon less than ethanol made from whole corn. In most cases, cheese plants pay some fee to get rid of the whey. It is therefore reasonable to assume that it could be obtained at no cost. No analysis of transportation costs have been done.

An ethanol plant producing 10 million gallons of ethanol per year, requires 2.2 million gallons of whey per week. A medium size cheese plant would produce about 750,000 gallons of whey per day. Three medium-sized cheese plants would be needed to supply a single ethanol plant.

Starch encapsulation of pesticide and pharmaceutical products

The Northern Regional Research Lab has developed and patented a process for coating materials using corn starch. The coating is to assure uniform release of active ingredients and to protect against undesired reactions during distribution and application of pesticides and pharmaceutical products.

Super absorbent materials from corn starch

During the 1970's the researchers at the Northern Regional Research Lab developed a process for producing a super slurper from corn starch which can absorbed 1000 times its weight in moisture. Three companies under the USDA patent are licensed to commercially produce and market the product. The product is currently being used in the making of diapers, for treatment of burns and wounds, the coating of seeds to accelerate germination and to increase yields, for the coating of roots of trees and

other plants that are to be transplanted, the elimination of water from fuel tanks and the treatment of soils to increase their water holding capacity.

Granulated synthetic rubber using corn starch

Research from the Department of Agriculture has succeeded in producing powdered rubbers with cheap material and an inexpensive process. The powered elastomers consist of latex particles encased in starch derivative that serve as a rubber reinforcing agent. A starch xanthate solution is made from, starch, water, sodium hydroxide, and carbon disulfide, all of which cost several times less than any general purpose rubbers.

Corn protein textile fiber

Zein is an odorless, nontoxic protein derived from corn. It is a by-product of corn processing, and it is made into a vegetable protein fiber, primarily used in blends.

The Virginia- Carolina Chemical Corporation did extensive industrial research on it, and in 1948 began to manufacture a zein fiber under the trade name of Vicara. Vicara is produced as an extremely soft, light golden, uniform fiber. Its insulation value is similar to that of animal fibers in a fabric like construction. Vicara has many characteristics like wool such as its warmth and it is water repellent. The water repellency is permanent at room temperature and is not removed by dry cleaning or repeated laundering. It resists acids and has an affinity for most dyes. Vicara is used chiefly in blends with other fibers. When blended with wool, Vicara upgrades the finished product and increases the wear life of these fabrics by enabling them to wear without pilling, stringing or fraying.

In spite of its apparent attractive characteristics, Vicara production was suspended by the Virginia-Carolina Chemical Corporation after a relatively brief period. It has not yet been determined what reasons motivated the decision to stop production.

Self-cooling cans

Laser Arms Corp.(OTC), announced it has unveiled a technology that it claims "will chill the world population by the year 2000." An ordinary can will have the ability to refrigerate itself upon opening. A Food and Drug Administration-approved aluminum sheath runs the length of the beverage container and is attached to the container on the inside top. The sheath is filled with carbon dioxide that is released through a controlled release valve located at the container top. As the tab to the container is pulled, a puncture pin penetrates the top of the sheath thereby releasing the carbon dioxide. As the CO2 is released, the

aluminum sheath freezes which in turn chills the contents of the container. The cost of the container is less than 2 cents per can, with a displacement-of-liquid factor of 2.5 ounces. If this new process proves economically feasible, large amounts of carbon dioxide would be required. Presently large amounts of carbon dioxide are produced as a by product of the ethanol from corn process. Carbon dioxide uses are limited so large quantities remain unsold.

APPENDIX D

Shrubs, grasses and forbs of Pope County

Shrubs

Salix bebiana (Bebb's willow)
Salix petiolaris (slender willow)
Rosa arkansana (prairie wildrose)
Amorpha canescens (lead plant)
Symphoricarpos occidentalis (wolfberry)

Grasses

Agropyron repens (quack grass)
Agropyron trachycaulum (slender wheat grass)
Andropogon gerardi (big bluestem)
Andropogon scoparius (little bluestem)
Bouteloua curtipendula (side-oats gram)
Bouteloua gracilis (blue grama)
Bromus inermis (hungarian brome grass)
Calamagrostis inexpansia (bog reed grass)
Elymus canadensis (nodding wild rice)
Glyceria straita (nerve manna grass)
Mulhenbergia cuspidata (plains satin grass)
Mulhenbergia glomerata (wild timothy)
Mulhenbergia mexicana (Mexican satin grass)
Panicum virgatum (switch grass)
Phleum compressa (Canada blue grass)
Poa pratensis (Kentucky blue grass)
Sertia glauca (yellow pigeon grass)
Sorghastrum nutans (Indian grass)
Spartina pectinata (cord grass)
Sporobolus heterolepis (northern dropseed)
Stipa spartea (porcupine grass)

Other Graminoides

Tyohia latifolia (broad-leaved cattail)
Scirpus fluviatilis (river bulrush)
Carex atherodes (sedge)

Forbs:Legumes

Astragalus adsurgens (ascending milk vetch)
Astragalus canadensis (Canadian milk vetch)
Medicago sativa (alfalfa)
Melilotus alba (white sweet clover)
Melilotus officinalis (yellow sweet clover)
Petalostemum purpureum (purple prairieclover)

Forbs:Asters

Aster azureus (sky-blue aster)
Aster ericoides (frost-weed aster)
Aster oblongifolius (aromatic aster)
Aster ptarmicoides (upland white aster)
Aster sericeus (silky aster)
Aster simplex (panicled aster)

Forbs:Solidagos

Solidago canadensis var. *gilvocanescens* (plains goldenrod)
Solidago gigantea (late goldenrod)
Solidago missouriensis (Missouri goldenrod)
Solidago rigida (stiff goldenrod)
Solidago speciosa (showy goldenrod)

Forbs: Other composites

Acchilea millefolium (yarrow)
Ambrosia artemisiifolia var. *elatior* (common ragweed)
Antennaria plantaginifolia (plantian-leaved everlasting)
Artemisia dracunculus (silky wormwood)
Artemisia frigida (pasture sagebrush)
Artemisia campestris (tall wormwood)
Artemisia ludoviciana var. *gnaphalodes* (dark-leaved mugwort)
Chrysopsis bakeri (golden aster)
Cirsium arvense (Canadian thistle)
Cirsium flodmani (Flodman's thistle)
Echinacea angustifolia (purple coneflower)
Helianthus giganteus (giant sunflower)
Helianthus maximiliani (Maximilian's sunflower)
Liatris aspera (rough blazing star)
Liatris punctata (dotted button-snakeroot)
Trapogon major (large goat's-beard)

Forbs: Monocots

Allium stellatum (prairie wild onion)

Forbs: Other dicots

Salsola kali (Russian thistle)
Polygonum coccinemeum (swamp smartweed)
Anemone canadensis (Canada anemone)
Anemone cylindrica (thimble weed)
Anemone patens (pasque flower)
Geum canadensis (large-leaved avens)
Geum triflorum (long-plumed purple avens)
Potentilla arguta (tall cinquefoil)

Oenothera biennis (evening primrose)
Oenothera serrulata (toothed-leaved evening primrose)
Zizia aptera (heart-leaved alexanders)
Gentiana puberula (small downy gentian)
Asclepias syriaca (common milkweed)
Asclepias verticillata (whorled milkweed)
Phlox pilosa var. *occidentalis* (prairie phlox)
Lithosspermum canescens (hoary vervain)
Monnarda fistulosa (wild bergamot)
Castilleja sessiliflora (downy painted cup)
Scrophularia lanceolate (lance-leaved figwort)
Verbascum thapsus (great mullein)
Galium boreale (Northern bedstraw)

The nomenclature used in Appendix D is from Cushing, Dr. E.J., EBB5014, class handouts.

Appendix E.

Table 1 . Cropland use in 1982, by land capability class and subclass.

Class and subclass	Cultivated cropland: Row crops	Close-grown crops	Double-cropped	Other cultivated crops	Total	Horticulture	Hayland	Total cropland
	1,000 acres							
I	18.1	3.6	0.0	0.0	21.7	0.0	0.6	22.3
IIe	53.8	28.7	0.0	3.6	86.1	0.0	1.2	87.3
IIw	19.4	11.5	0.0	1.2	32.1	0.0	5.5	37.6
IIs	3.0	3.2	0.0	1.1	7.3	0.0	1.0	8.3
IIc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All II	76.2	43.4	0.0	5.9	125.5	0.0	7.7	133.2
IIIe	19.6	19.2	0.0	1.7	40.5	0.0	0.6	41.1
IIIw	5.6	3.1	0.0	0.0	8.7	0.0	0.0	8.7
IIIs	30.6	9.0	0.0	0.8	40.4	0.0	1.1	41.5
IIIc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All III	55.8	31.3	0.0	2.5	89.6	0.0	1.7	91.3
I-III	150.1	78.3	0.0	8.4	236.8	0.0	10.0	246.8
IVe	4.2	5.7	0.0	0.6	10.5	0.0	0.0	10.5
IVw	0.6	0.0	0.0	0.0	0.6	0.0	0.0	0.6
IVs	5.9	1.7	0.0	1.2	8.8	0.0	0.0	8.8
IVc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All IV	10.7	7.4	0.0	1.8	19.9	0.0	0.0	19.9
I-IV	160.8	85.7	0.0	10.2	256.7	0.0	10.0	266.7
V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIe	0.6	0.7	0.0	0.7	2.0	0.0	0.0	2.0
VIw	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6
VIs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All VI	0.6	0.7	0.0	0.7	2.0	0.0	0.6	2.6
VIIe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIIw	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIIs	0.4	0.7	0.0	0.0	1.1	0.0	1.0	2.1
VIIc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All VII	0.4	0.7	0.0	0.0	1.1	0.0	1.0	2.1
VIII	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V-VIII	1.0	1.4	0.0	0.7	3.1	0.0	1.6	4.7
NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	161.8	87.1	0.0	10.9	259.8	0.0	11.6	271.4

Source: USDA Soil Conservation Service Resources Inventory, 1982-September 1985.

LAND CAPABILITY CLASS:

I. Soils have few limitations that restrict use.

II. Soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

III. Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

IV. Soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

V. Soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife habitat.

VI. Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.

VII. Soils have very severe limitations that make them unsuited to cultivation and restrict their use largely to range, woodland, or wildlife food and cover.

VIII. Soils and landforms have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife habitat, water supply, or esthetic purposes.

SUBCLASS:

e: Limitations due to soil erosion potential.

w: Limitations due to soil wetness.

s: Limitations due to high sand content of soil.

c: Limitations due to high clay content of soil.

Table 2 . Land cover/use of nonfederal land and small water in 1982, by land capability class and subclass.

Class and subclass	Rural land						Urban and built-up land	Rural transportation	Small water areas	Total
	Cropland	Pastureland	Rangeland	Forest land	Minor land cover/uses	Total				
	1,000 acres									
I	22.3	0.0	0.0	0.0	2.2	24.5	0.0	0.0	0.0	24.5
IIe	87.3	5.0	0.0	3.3	3.8	99.4	0.0	0.0	0.0	99.4
IIw	37.6	14.7	0.0	0.0	0.3	52.6	0.0	0.0	0.0	52.6
IIs	8.3	0.0	0.0	0.0	0.0	8.3	0.0	0.0	0.0	8.3
IIc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All II	133.2	19.7	0.0	3.3	4.1	160.3	0.0	0.0	0.0	160.3
IIIe	41.1	8.6	0.0	2.1	2.3	54.1	0.0	0.0	0.0	54.1
IIIw	8.7	7.9	0.0	1.9	4.1	22.6	0.0	0.0	0.0	22.6
IIIs	41.5	4.6	0.0	0.0	1.5	47.6	0.0	0.0	0.0	47.6
IIIc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All III	91.3	21.1	0.0	4.0	7.9	124.3	0.0	0.0	0.0	124.3
I-III	246.8	40.8	0.0	7.3	14.2	309.1	0.0	0.0	0.0	309.1
IVe	10.5	4.5	0.0	3.1	0.0	18.1	0.0	0.0	0.0	18.1
IVw	0.6	0.6	0.0	0.0	1.2	2.4	0.0	0.0	0.0	2.4
IVs	8.8	5.2	0.0	0.0	0.0	14.0	0.0	0.0	0.0	14.0
IVc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All IV	19.9	10.3	0.0	3.1	1.2	34.5	0.0	0.0	0.0	34.5
I-IV	266.7	51.1	0.0	10.4	15.4	343.6	0.0	0.0	0.0	343.6
V	0.0	1.3	0.0	0.0	4.6	5.9	0.0	0.0	0.0	5.9
VIe	2.0	1.9	0.0	1.2	0.0	5.1	0.0	0.0	0.0	5.1
VIw	0.6	7.3	0.0	1.5	9.3	18.7	0.0	0.0	0.0	18.7
VIs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All VI	2.6	9.2	0.0	2.7	9.3	23.8	0.0	0.0	0.0	23.8
VIIe	0.0	1.3	0.0	1.9	0.0	3.2	0.0	0.0	0.0	3.2
VIIw	0.0	0.6	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.6
VIIs	2.1	7.6	0.0	2.5	0.4	12.6	0.0	0.0	0.0	12.6
VIIc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All VII	2.1	9.5	0.0	4.4	0.4	16.4	0.0	0.0	0.0	16.4
VIII	0.0	0.7	0.0	0.0	6.7	7.4	0.0	0.0	0.0	7.4
V-VIII	4.7	20.7	0.0	7.1	21.0	53.5	0.0	0.0	0.0	53.5
NA	0.0	0.0	0.0	0.0	0.5	0.5	4.0	11.0	3.2	18.7
Total	271.4	71.8	0.0	17.5	36.9	397.6	4.0	11.0	3.2	415.8

Source: USDA Soil Conservation Service Resources Inventory, 1982-September 1985.

LAND CAPABILITY CLASS:

I. Soils have few limitations that restrict use.

II. Soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

III. Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

IV. Soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

V. Soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife habitat.

VI. Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.

VII. Soils have very severe limitations that make them unsuited to cultivation and restrict their use largely to range, woodland, or wildlife food and cover.

VIII. Soils and landforms have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife habitat, water supply, or esthetic purposes.

SUBCLASS:

e: Limitations due to soil erosion potential.

w: Limitations due to soil wetness.

s: Limitations due to high sand content of soil.

c: Limitations due to high clay content of soil.

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